Sunnyvale VISION ZERO TECHNICAL APPENDIX

Approved by City Council
July 30, 2019

Sunnyvale

Photographs provided by the City of Sunnyvale and Fehr & Peers

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TECHNICAL APPENDIX

A. Summary of Input from Public Outreach Activities

B. Summary of Collision Trends

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A. SUMMARY OF INPUT FROM PUBLIC OUTREACH ACTIVITIES

FEHR PEERS

City of Sunnyvale Vision Zero Plan
Online Survey Results Summary, November 2017

The City of Sunnyvale posted an online survey for the Vision Zero Plan to solicit input from the community on traffic safety concerns in Sunnyvale. The survey was open in September and October 2017.

Multiple Choice Questions

A summary of results from the online survey multiple choice questions is as follows.

What is your primary mode of transportation for travel in Sunnyvale?

	Response Percent	Response Count
Personal Vehicle	82.0%	318
Carpool	0.5%	2
Bicycle	11.3%	44
Walking	2.3%	9
Public Transportation	0.5%	2
Other	3.4%	13

Does safety affect the mode of transportation you chose for travel in Sunnyvale?

	Response Percent	Response Count
Yes	65.9%	255
No	34.1%	132

What would be your primary mode of transportation in Sunnyvale if safety were not a consideration?

	Response Percent	Response Count
Personal Vehicle	46.7%	176
Bicycle	41.9%	158
Walking	7.7%	29
Public Transportation	1.3%	5
Other	2.4%	9

How often do you travel by walking (i.e. work, school, shopping, etc.)?

	Response Percent	Response Count
Daily	23.5%	91
Weekly	34.4%	133
Monthly	18.1%	70
Never	18.3%	71
Other	5.7%	22

How often do you travel by bicycle (i.e. work, school, shopping, etc.)?

	Response Percent	Response Count
Daily	14.9%	58
Weekly	17.3%	67
Monthly	12.6%	49
Never	48.2%	187
Other	7.0%	27

Who do you feel is most responsible for keeping roadways safe?

	Response Percent	Response Count
Department of Public Works	15.6%	60
Department of Public Safety	16.1%	62
All road users	59.7%	230
Other	8.6%	33

What is your top traffic safety concern in the City?

	Response Percent	Response Count
Speeding	24.0%	93
Red light runners	17.3%	67
Illegal turning	5.4%	21
Traffic congestion	20.1%	78
Pedestrians illegally crossing	0.8%	3
Bicyclists riding unsafely	3.6%	14
Other	28.9%	112

Source: Sunnyvale Vision Zero online survey. Accessed November 9, 2017; 388 responses. (https://www.peakdemocracy.com/portals/209/Issue_5386/survey_responses)

Map Comments

The online survey map asked participants to indicate where they have noticed transportation safety issues and to include a comment describing the concern. Participants dropped 1,542 pins on the online map. Fehr & Peers classified the survey map comments into 20 categories, listed below.

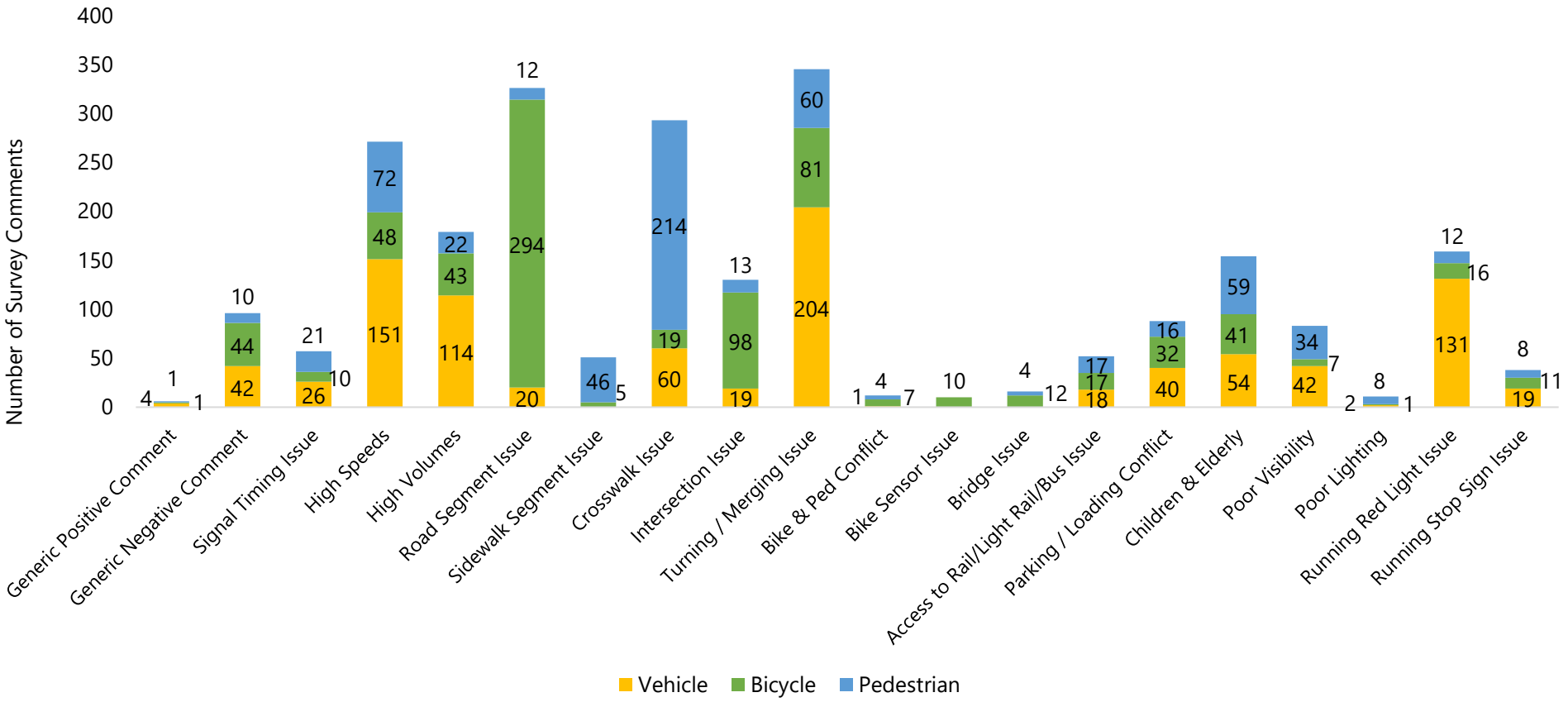
1. Signal Timing Issue
2. High Speeds
3. High Volumes
4. Road Segment Issue
5. Sidewalk Segment Issue
6. Crosswalk Issue
7. Intersection Issue
8. Turning / Merging Issue

9. Bike & Ped Conflict
10. Bike Sensor Issue
11. Bridge Issue
12. Access to Rail/Light Rail/Bus Issue
13. Parking / Loading Conflict
14. Children & Elderly
15. Poor Visibility
16. Poor Lighting
17. Running Red Light Issue
18. Running Stop Sign Issue
19. Generic Positive Comment
20. Generic Negative Comment

Two thirds of the survey comments (912) were classified under one category. One third of the survey comments (619) were classified under more than one category. Eleven comments were not categorized.

The most frequently mentioned pedestrian comments related to crosswalk issues (214, 34%), high speeds (72, 11%), turning/merging issues (60, 9%) and children/elderly (59, 9%). The most frequently mentioned bicycle comments related to road infrastructure/segment issues (294, 37%), intersection issues (98, 12%) and turning/merging issues (81, 10%). The most frequently mentioned vehicle comments related to turning/merging issues (204, 22%), high speeds (151, 16%) and running red light issues (131, 14%).

The figure on the following page shows the number of comments by mode and category.

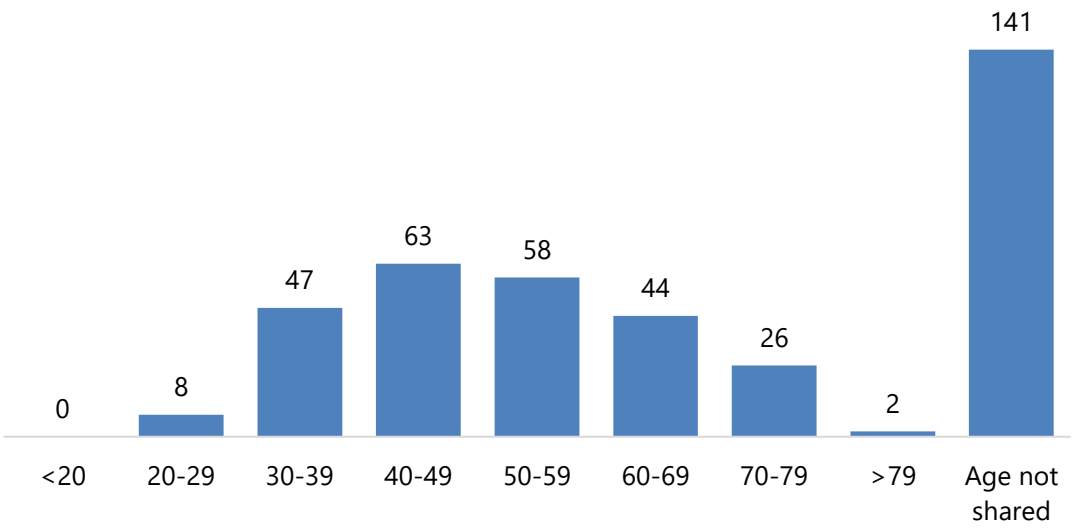


Source: Sunnyvale Vision Zero online survey. Accessed October 19, 2017; 371 responses.
(https://www.peakdemocracy.com/portals/209/Issue_5386/survey_responses)

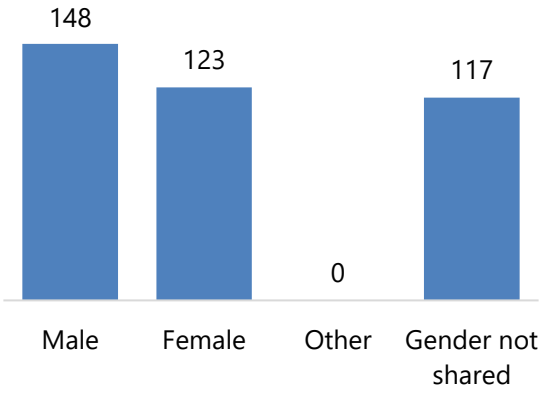
Participant Demographics

A summary of online survey participant demographics is as follows.

Age

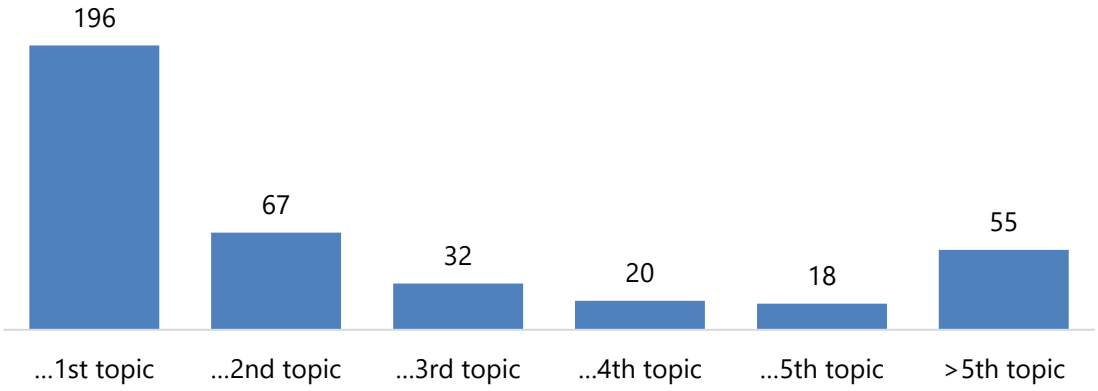


Gender



Frequency of participation

Frequency of participation reflects how many surveys a given respondent has completed through Open Town Hall. The results show that this was the first Open Town Hall survey completed for many respondents.



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FEHR PEERS

City of Sunnyvale Vision Zero Plan
Community Workshop Key Takeaways, October 2017

The City of Sunnyvale hosted the first Vision Zero Plan Community Workshop October 5, 2017, to raise awareness for Vision Zero and to understand perceived issues, unreported collisions, close calls and other potentially challenging conditions. Thirteen participants used voting boards to provide citywide feedback about mode choices, safety concerns, and preferences for safety treatments. They also provided location-specific feedback about safety concerns on aerial maps.

Voting Boards Summary

Participants were asked their primary mode of travel, top safety concerns, views on responsibility for road safety, and preferred safety enhancements.

- Personal vehicle and bicycle were the top two primary modes of travel for participants, with five and four votes, respectively. Two participants chose walk and one participant chose motorcycle.
- The top safety concern among participants was red light runners (5), followed by traffic congestion (3) and bicyclists riding in an unsafe manner or violating traffic laws (2). Participants also noted speeding (1) and short crossing times (1).
- Nearly all participants stated that all road users are most responsible for keeping roads safe. One participant indicated the Department of Public Safety. The Department of Public Works received no votes, but the results may have been affected by the fact that several participants did not know that Public Works is responsible for designing roadways (based on conversations with participants).
- Participants voted on the top three safety enhancements they would like implemented in Sunnyvale. The most votes (4) were given to widening or adding connectivity of sidewalks; bicycle lanes; and turn signals for vehicles and traffic signal coordination and timing. Midblock pedestrian crossings and separated bike lanes received three votes each.

Tables summarizing the voting boards are included in **Attachment 1**.

Map Summary

Participants reported transportation safety feedback at specific locations in Sunnyvale by mode, placing 105 pins for bicycles, 38 pins for pedestrians, and 18 pins for vehicles. Common themes included support for:

- Filling gaps in bicycle network with high-quality facilities that are comfortable and convenient for cross-city travel – including on expressways (participants expressed appreciation for Evelyn Avenue and Duane Avenue bicycle facilities)

- Filling gaps in pedestrian network with improved crossings – including using HAWKs or other high visibility crossing treatments
- Enhancing crossings of major roadways near schools (for example, the crossing of ECR at the middle school on Poplar)
- Improving pedestrian and bicycle access through ramp intersections at highways and arterials
- Improving pedestrian and bicycle accommodations on overpasses
- Addressing conflict areas with high pedestrian and bicycle activity near
    - Transit (e.g., Caltrain, LRT)
    - Schools, particularly during pick-up and drop-off periods
    - Shopping centers
    - Restaurants near office parks

Locations with high concentrations of pins largely aligned with the corridors on the City's High Injury Network, including:

- 237 ramps/overpasses at N Mathilda Ave and Lawrence Expy
- 101 ramps/overpasses at N Mathilda Ave, Fair Oaks Ave, and Lawrence Expy
- Tasman Dr, in particular at Fair Oaks Ave intersection
- Maude Ave
- Central Expy
- Evelyn Ave between Mathilda and Sunnyvale
- El Camino Real
- Reed Ave near Lawrence Expy
- Fremont Ave
- Homestead Rd
- Bernardo Ave
- Mary Ave
- Mathilda Ave
- Sunnyvale Ave between Maude and Evelyn
- Fair Oaks Ave
- Wolfe Rd
- Lawrence Expy

ATTACHMENT 1. VOTING BOARDS RESULTS

Table 1. Primary Mode of Transportation

Primary Mode	Count
Personal Vehicle	5
Bike	4
Walk	2
Motorcycle	1
Taxi/Ridesharing App	0
Public Transit	0
Carpool	0
Other	0

Table 2. Top Safety Concerns

Traffic Safety Concern	Count
Red light runners	5
Traffic congestion	3
Bicyclists riding in an unsafe manner or violating traffic laws	2
Speeding	1
Pedestrians illegally crossing streets	0
Illegal turning	0
Other: Crossing times too short	1

Table 3. Responsibility for Road Safety

Party or Agency	Count
All road users	6
Department of Public Safety	1
Department of Public Works	0
Other	0

Table 4. Preferred Safety Enhancements

Safety Enhancement	Count
Sidewalks (widen or add connectivity)	4
Bike lanes	4
Turn signals for vehicles and traffic signal coordination and timing	4
Separated bike lanes	3
Mid-block pedestrian crossings	3
Narrower travel lanes	2
Crosswalks and pedestrian signals at intersections (including ADA accessibility)	2
Greater separation between sidewalks and vehicle traffic	1
Traffic calming (roundabouts, traffic circles, speed bumps)	1
Improve sight distances at corners	1
Bicycle sharrows	0
Bicycle detection at traffic signals	0
Add streetlighting for improved visibility	0

FEHR PEERS

City of Sunnyvale Vision Zero Plan
Community Workshop and Online Survey Key Takeaways, April 2018

The City of Sunnyvale hosted the second Vision Zero Plan Community Workshop on April 5, 2018. The workshop goals were to provide an update on the plan progress and to gather feedback from local residents and employees on preferred citywide safety strategies and infrastructure improvements to address safety concerns at ten priority project locations in Sunnyvale. Twenty-one participants provided 153 comments on priority project location posters that contained proposed safety treatments and crash data by mode, severity, location, and cause. Participants also voted on draft citywide safety strategies that the City could focus on as part of the Vision Zero Plan.

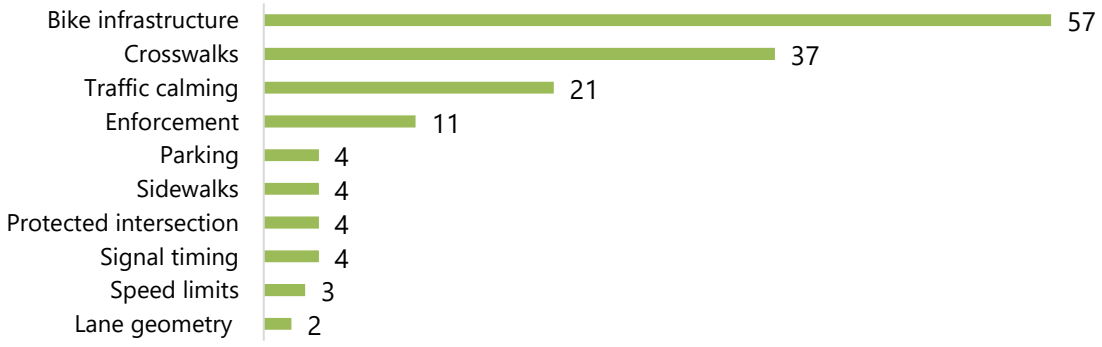
To complement the workshop, the City requested public input through an online survey. The survey was available on the Sunnyvale Vision Zero webpage from mid- to late-April 2018. It received 230 visitors and 75 responses. Respondents were asked to vote on countermeasures and provide comments on how to improve safety at each priority location.

PRIORITY LOCATION COUNTERMEASURES

Workshop Overview

Participants provided their input on preferred transportation safety countermeasures at the ten priority project locations in Sunnyvale. Common themes across the locations are summarized in **Figure 1**. Bicycle infrastructure was the most requested countermeasure at the priority project locations, followed by crosswalks and traffic calming.

Figure 1. Preferred Countermeasures at Priority Locations, by Category (Workshop)

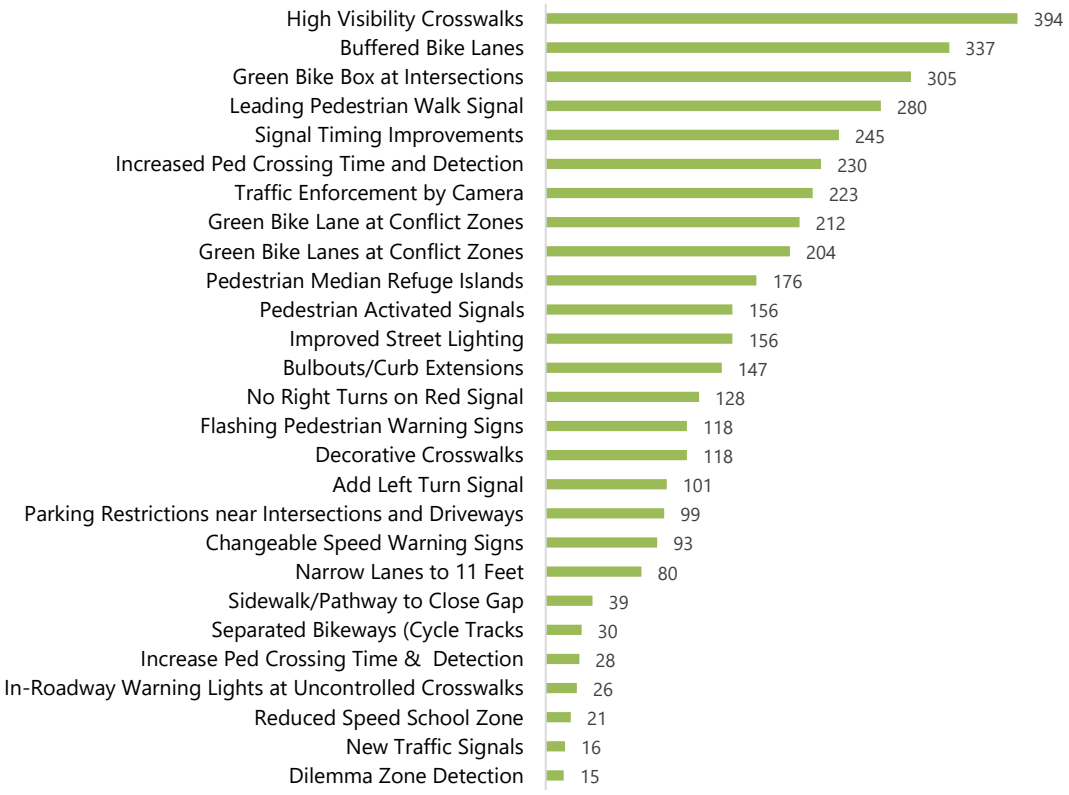


Survey Overview

The Sunnyvale Vision Zero online survey was available to the public from mid- to late April 2018. Seventy-five respondents provided their preferences for specific countermeasures at the ten priority project locations. Responses by priority location are described in greater detail in subsequent sections. **Figure 2** shows the preferred countermeasures across all priority locations. High visibility crosswalks, buffered bike lanes, and green bike boxes at intersections were most preferred overall.

Online survey respondents also provided text comments. Overall, many commenters recommended reducing vehicular speeds through lower speed limits and roadway redesign, providing green paint or buffered bicycle lanes, modifying crosswalks to be more visible to vehicles, and adding pedestrian and bicycle bridges or tunnels. Narrowing driving lanes to slow drivers and adding protected left turns were also suggested at multiple locations.

Figure 2. Preferred Countermeasures at Priority Locations (Online Survey)



Priority Location #1: El Camino Real between S. Mary Avenue and S. Mathilda Avenue

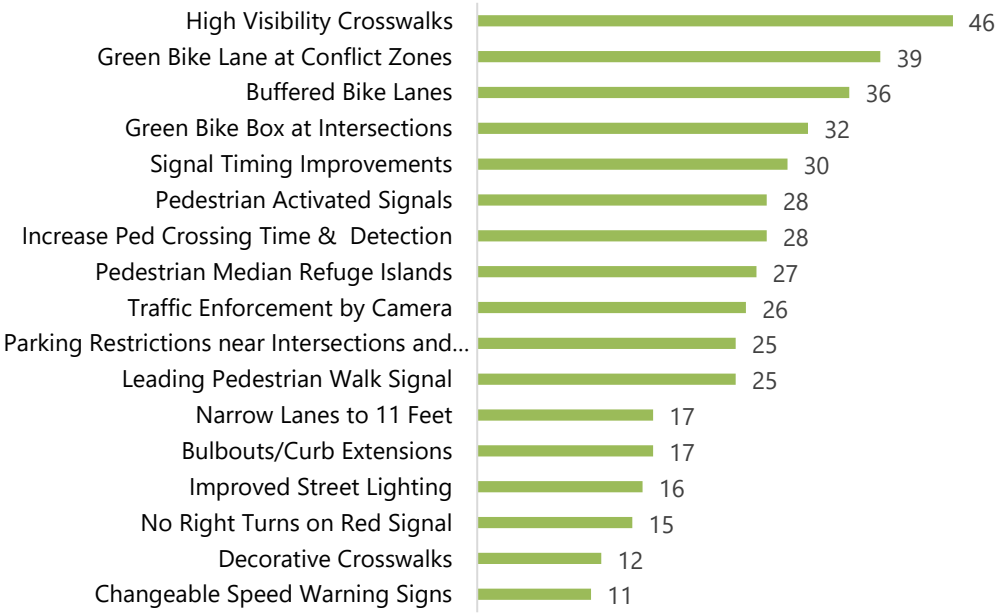
Workshop Comments

Responses for Priority Location #1 requested improved pedestrian crossings through leading pedestrian intervals (LPI), curb extensions, or varying crosswalk materials, traffic calming of vehicles to slow speeds, and bicycle lanes. One respondent recommended eliminating on-street parking on El Camino Real to provide space for bike lanes and improve visibility. Another respondent suggested increasing traffic enforcement.

Survey Results

Survey responses for Priority Location #1 are summarized in **Figure 3**. The top three requested treatments at this location were high visibility crosswalks, green bike lanes at conflict zones, and buffered bike lanes.

Figure 3. Online Survey Responses, Priority Location #1



Survey Comments

Additional survey comments for Priority Location #1 noted that this corridor is along a major school commute route, and therefore it is important to protect bike commuters on this roadway from vehicles traveling at high speeds and to consider adding crossing guards near schools. One respondent noted:

> *"There are a large number of pedestrians that gather at Pastoria and ECR at school commute times. They overflow [the] intersection. A bulbout would be helpful. Also many people whip around this intersection making right turns and risk pedestrian safety… Protecting bike commuters through here is important for the same reasons."*

Lower speeds were also requested – a commenter noted that 40 MPH is too high for a corridor where pedestrians are prevalent.

Priority Location #2: El Camino Real between S. Taaffe Street and S. Fair Oaks Avenue

Workshop Comments

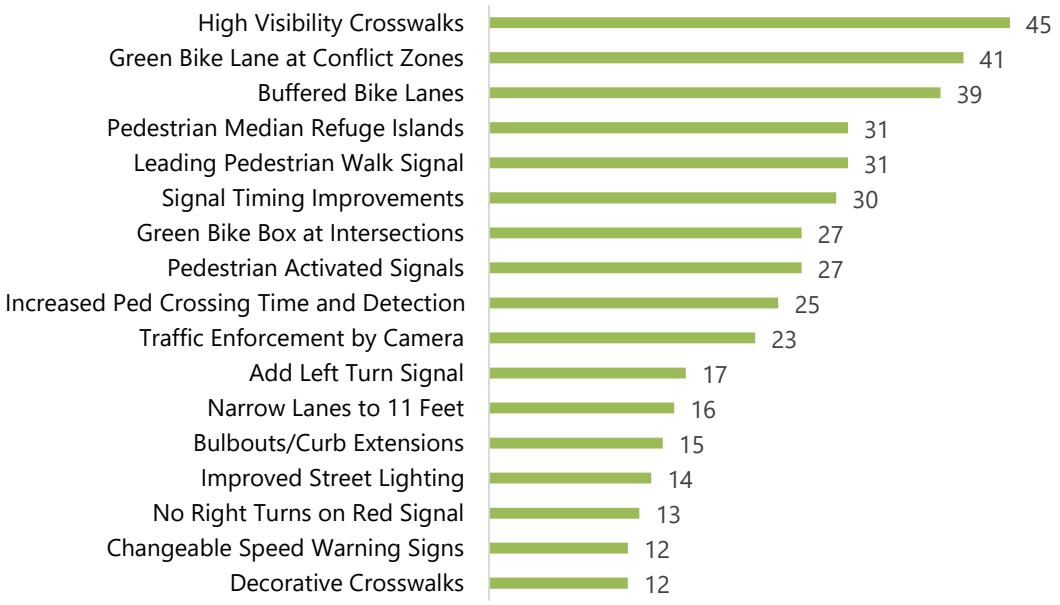
At Priority Location #2, participants noted the need for pedestrian infrastructure, including pedestrian refuge islands, pedestrian detection, HAWK or RRFBs for mid-block crossings, and measures that remove conflicts between pedestrians and left-turning vehicles. Neighborhood cut-

through, speeding on neighborhood streets, and the lack of safe bicycle infrastructure were also noted. Implementing protected intersections as a means to improve bicycle and pedestrian safety was recommended.

Survey Results

Figure 4 shows survey results for Priority Location #2. The most requested countermeasures at this location were high visibility crosswalks, green bike lanes at conflict zones, and buffered bike lanes.

Figure 4. Online Survey Responses, Priority Location #2



Survey Comments

Many survey comments reflect and echo the votes shown in **Figure 4** for Priority Location #2. Additional comments suggest narrowing traffic lanes to slow traffic and encourage drivers to pay attention, using more reflective roadway paint, and providing a bicycle detection button within reach of the bike lanes instead of at the crosswalks. Several commenters suggested a pedestrian/bicycle bridge or tunnel to serve the volume of people crossing between shopping centers far from intersections, as quoted below:

> *"A more comprehensive fix for this location could be to build pedestrian bridge to connect the two shopping areas on both sides of El Camino Real."*

Priority Location #3: El Camino Real between E. Fremont Avenue and S. Wolfe Road

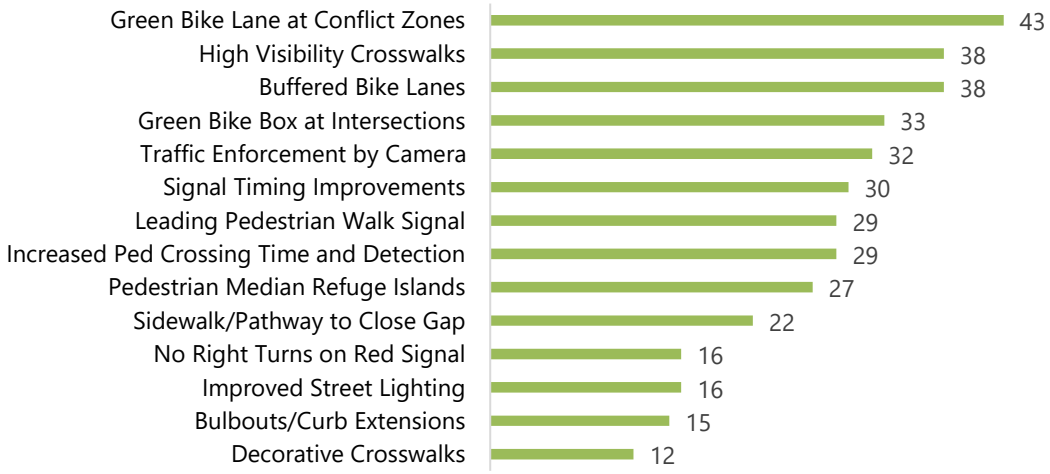
Workshop Comments

Recommendations for Priority Location #3 included implementing traffic calming infrastructure – such as speed tables, chicanes, and rotaries – as well as providing an off-street path for pedestrians and bicyclists. Other comments echoed recommendations for Location #1 and #2, also on El Camino Real, and included providing bicycle lanes with physical barriers, pedestrian refuge islands, pedestrian detection and countdown timers at traffic signals, and reconfiguring intersections to protect bicyclists and pedestrians.

Survey Results

Figure 5 shows online survey results for Priority Location #3. Similar to the previous priority locations, the top three requested countermeasures at this location were green bike lanes at conflict zones, high visibility crosswalks, and buffered bike lanes.

Figure 5. Online Survey Responses, Priority Location #3



Survey Comments

Several respondents' comments for Priority Location #3 included improving wayfinding and signage to lessen confusion on this section of El Camino Real, as quoted below:

> *"This 'triangle' seems to confuse a lot of drivers. Some drive impossibly slowly on a green light while others think they can gun it to make it through both intersections (Fremont Ave & El Camino Real)."*

One commenter recommended rerouting southbound left vehicles on Wolfe to El Camino Real to use Fremont Avenue instead and to reroute vehicles westbound to use Fremont Avenue instead of El Camino Real.

Priority Location #4: Remington Drive / Fair Oaks Avenue between Iris Avenue and Manet Drive

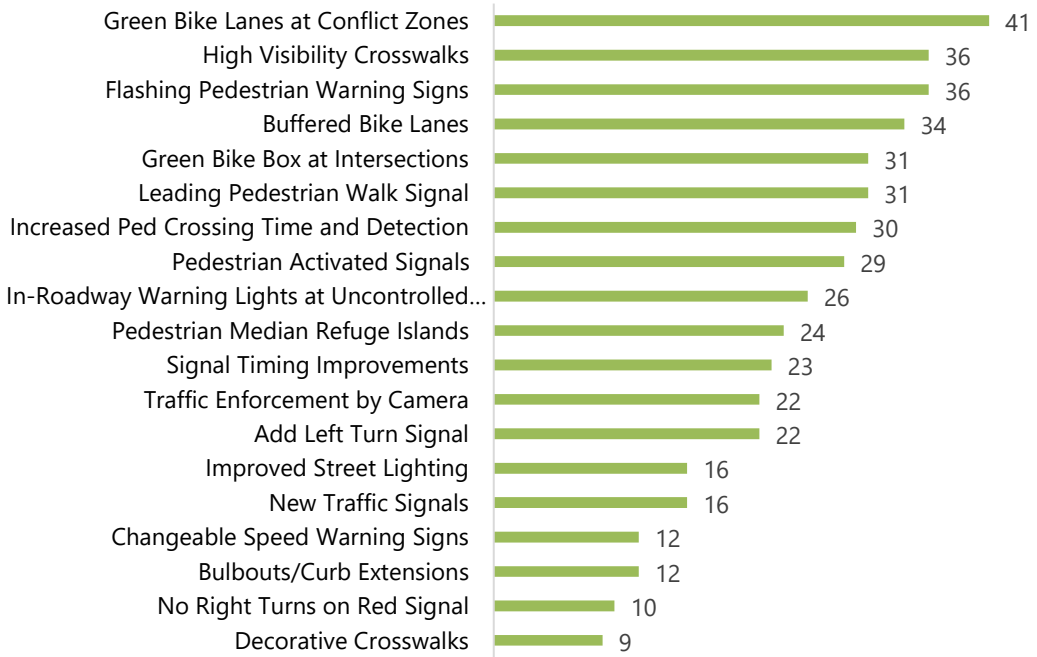
Workshop Comments

Participants' recommendations at this location focused on bicycle infrastructure, such as bike boxes, buffered bike lanes, and green paint at conflict points. Increased enforcement and added speed tables were suggested as a means to slow traffic. One participant noted that the senior center and senior housing are located on either side of Remington Drive, and that person suggested providing a better connection mid-block for seniors to safely access the recreational facilities.

Survey Results

Survey responses of countermeasure preferences at Priority Location #4 are shown in **Figure 6.** The top three requested countermeasures at this location were green bike lanes at conflict zones, high visibility crosswalks, and flashing pedestrian warning signs.

Figure 6. Online Survey Responses, Priority Location #4



Survey Comments

Respondents provided comments to supplement their responses in **Figure 6.** One commenter requested advance limit lines:

> *"Perhaps the traffic lights and stop line for cars could be 10 feet earlier (i.e. further away from the actual intersection). That way, there would be a little more space to detect pedestrians and to react."*

Other respondents noted that many pedestrians in this area are going to the community center and that green and buffered bike lanes remind drivers to anticipate pedestrians and bicyclists. One respondent recommended that the bike lanes on Remington and Fair Oaks be extended all the way to the intersection with El Camino Real and stated that buses often block the bike lanes on Remington and Fair Oaks.

Priority Location #5: El Camino Real between Henderson Avenue and Helen Avenue

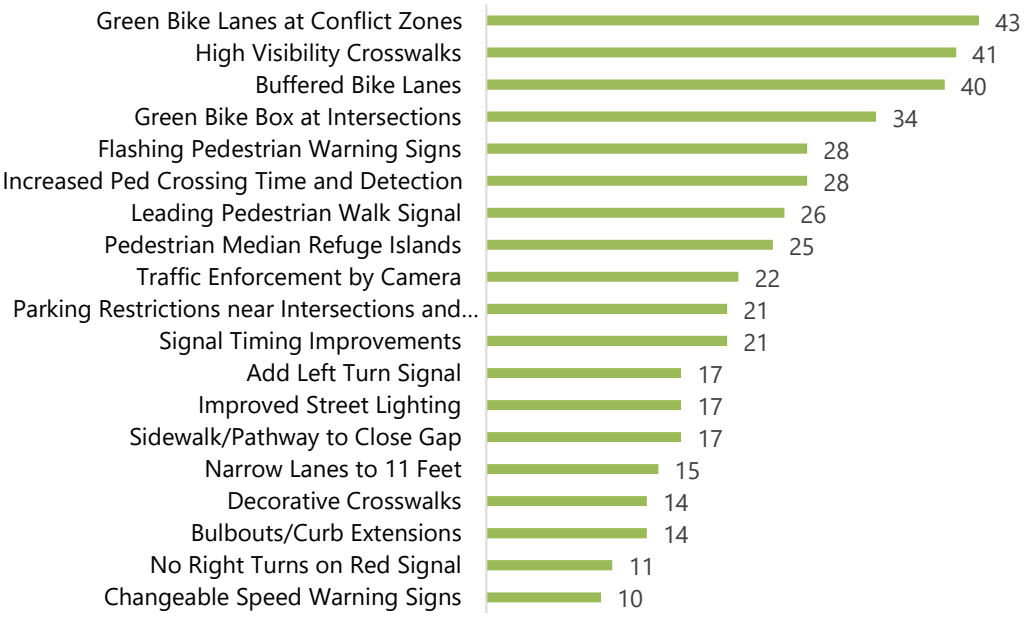
Workshop Comments

Recommendations for Priority Location #5 for pedestrian infrastructure included pedestrian refuge islands, high visibility crosswalks with advance limit lines, and wider sidewalks. Eight of the 19 comments on this segment noted the need for some type of separated bicycle lanes. Additional suggestions included adjusting signal timing to shorten the wait times, increasing enforcement, and reducing the speed limit to match adjacent jurisdictions.

Survey Results

Survey results for Priority Location #5 are summarized in **Figure 7**. The top four requested countermeasures at this location were green bike lanes at conflict zones, high visibility crosswalks, buffered bike lanes, and green bike boxes at intersections.

Figure 7. Online Survey Responses, Priority Location #5



Survey Comments

Online survey respondents provided additional comments. One respondent noted that to cross El Camino Real from Henderson, there is no clear path for bikes to follow. Another stated:

> *"This corridor, along with the intersection of El Camino Real and Poplar, are direct entry points for Peterson Middle School. It is ludicrous that there are no crossing guards, no light-up crosswalks, no bike lanes…to keep our kids safe…At least provide crossing guards as an interim measure until the City can (hopefully) install light-up crosswalks with longer lead time, buffered bike lanes, or changes to signal timing."*

It was also recommended that a protected left turn be added at El Camino Real and Henderson, because respondents observe that vehicles making a left turn from Henderson onto El Camino Real often do not yield to student pedestrians, bicyclists, or on-coming traffic.

Priority Location #6: N. Mathilda Avenue and W. Maude Avenue

Workshop Comments

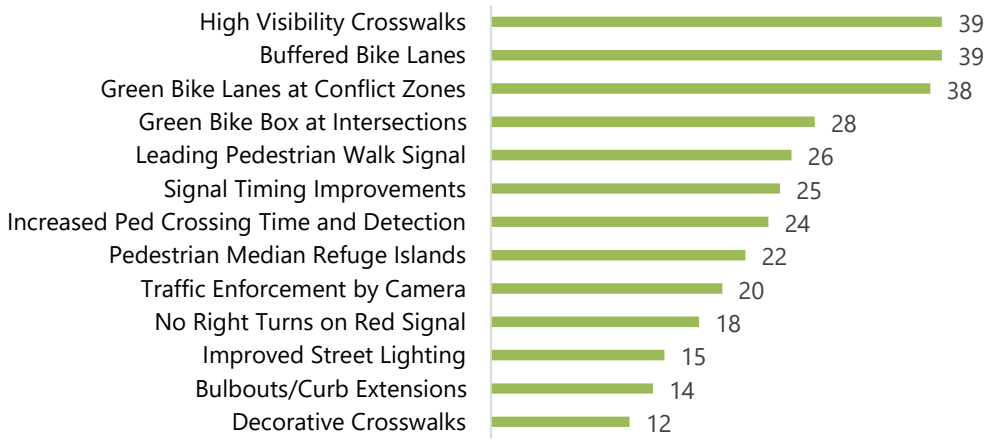
Comments at Priority Location #6 echoed those at other locations. They focused on improving pedestrian and bicycle infrastructure and traffic calming. Participants noted the need to physically alert drivers to pedestrian and bicyclists in this area. A pedestrian scramble, speed tables, LPI,

pedestrian refuge islands, and rumble strips were suggested for this intersection. Three participants noted that there are many pedestrians in this area, and multiple participants stated that they are not comfortable bicycling on the sharrows and bike lanes currently in place.

Survey Results

Figure 8 summarizes the online survey responses at Priority Location #6. The top three selected countermeasures at this location were high visibility crosswalks, buffered bike lanes, and green bike lanes at conflict zones.

Figure 8. Online Survey Responses, Priority Location #6



Survey Comments

One respondent noted that bicycle lanes end on Maude before the intersection and continue after the intersection, requesting a clearly marked path for bicyclists through the intersection. Other requested treatments included lower speed limits, adding a diagonal (scramble) crosswalk from Mathilda to the Sunnyvale Square shopping center, and removing parking near the Lucky shopping center to provide room for bicycle facilities. Modifying driveways to only certain movements was also suggested, as quoted below:

> *"[On] W Maude between N Mathilda and N Mary Ave… Drivers emerge from office buildings in Peery Park onto W Maude and attempt to cross all lanes of traffic to turn right onto N Mathilda Ave (headed south) or to cross lanes of traffic to turn left at N Mathilda Ave (headed north). Drivers sometimes stop, perpendicular to the flow of traffic while attempting a left turn onto W Maude from office building driveways. The simplest, cheapest, and safest solution to this dangerous situation is to route all office building traffic to Pastoria and Potrero Aves with traffic control at the exit points*

from the office campuses. Then, drivers can safely turn left or right onto W Maude without injury to bikers, pedestrians, or motorists."

Priority Location #7: N. Fair Oaks Avenue between Balsam Avenue and E. Taylor Avenue

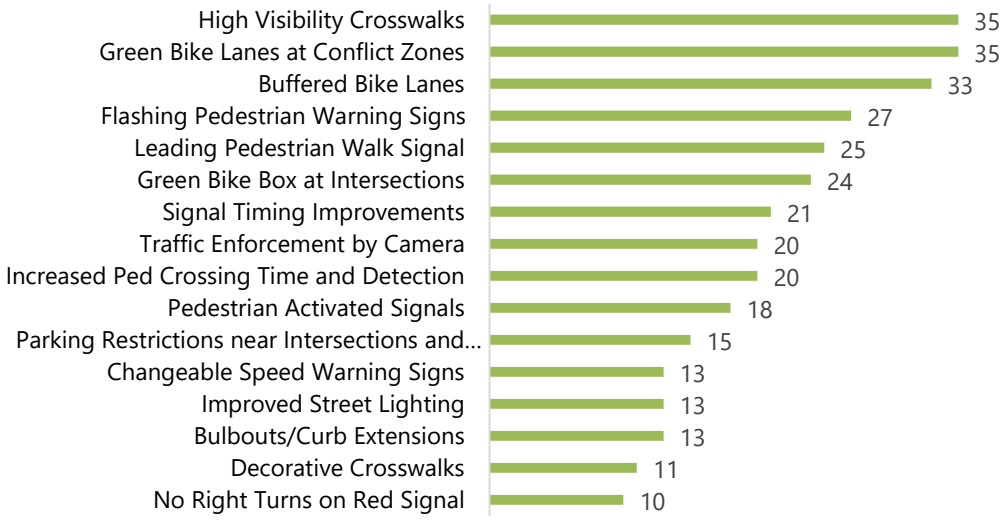
Workshop Comments

Participants requested buffered or protected bicycle lanes and a pedestrian crossing table or HAWK crossing near Fair Oaks Park at Priority Location #7. With plans in place to upgrade the park, responses noted that additional park users and children will likely cross Fair Oaks in this area. Traffic calming measures and speed enforcement were also recommended to slow speeds.

Survey Results

Survey results for Priority Location #7 are shown in **Figure 9**. The top three requested countermeasures at this location were high visibility crosswalks, green bike lanes at conflict zones, and buffered bike lanes.

Figure 9. Online Survey Responses, Priority Location #7



Survey Comments

Multiple survey comments for Priority Location #7 requested providing a pedestrian and/or bicycle bridge over Fair Oaks. Other comments included suggestions to not allow left turns out of the Chavez Supermarket and shopping area and to close Maude Avenue to through traffic between Fair Oaks and Wolfe.

One respondent suggested providing bicycle infrastructure, quoted below:

> *"Shortcut traffic through Duane should be eliminated. A neighborhood parallel bike path or a dedicated bike lane in the parking spaces should be a focus as Fair Oaks is currently too dangerous for cyclists."*

Priority Location #8: Fremont Avenue between Sunnyvale Saratoga Road and Floyd Avenue

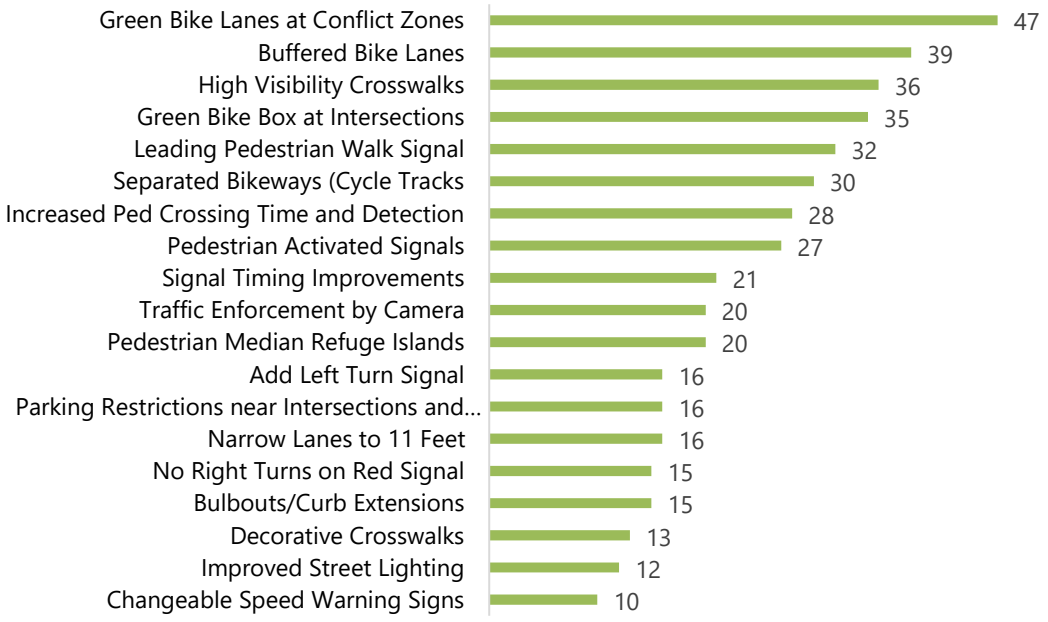
Workshop Comments

Recommendations for Priority Location #8 focused on traffic calming and bicycle infrastructure. Several participants noted that curb extensions pose a safety risk for bicyclists, stating that they cause bicyclists to swerve towards traffic. It was suggested that curb extensions be designed with cut-throughs for bicyclists. A pedestrian scramble, narrower traffic lanes, and increased enforcement were also recommended.

Survey Results

Figure 10 shows the online survey responses for preferred countermeasures at Priority Location #8. Results indicate that the preferred countermeasure at this location were green bike lanes at conflict zones, buffered bike lanes, and high visibility crosswalks.

Figure 10. Online Survey Responses, Priority Location #8



Survey Comments

Comments for Priority Location #8 suggested adding protection for bicyclists and pedestrians at intersections via physical protection for bicyclists near the shopping area parking lot entrances and exits and adding leading pedestrian intervals (LPIs) so that pedestrians have priority to cross before right turning vehicles.

One commenter stated:

> *"The intersection at E. Fremont Ave and Bobwhite / Manet Avenues should be designated as a school crossing. The intersection is used by students to get to/from Fremont High School and Stocklmeir Elementary, it gets more student pedestrian traffic than the Cascade Ave and Hollenbeck Ave intersection which is already designated as a school crossing. The existing School Zone signage on East Fremont does not conform to the standards/guidelines in CA MUTCD, [so] the signage should be updated."*

Priority Location #9: Homestead Road between Heron Avenue and Wolfe Road

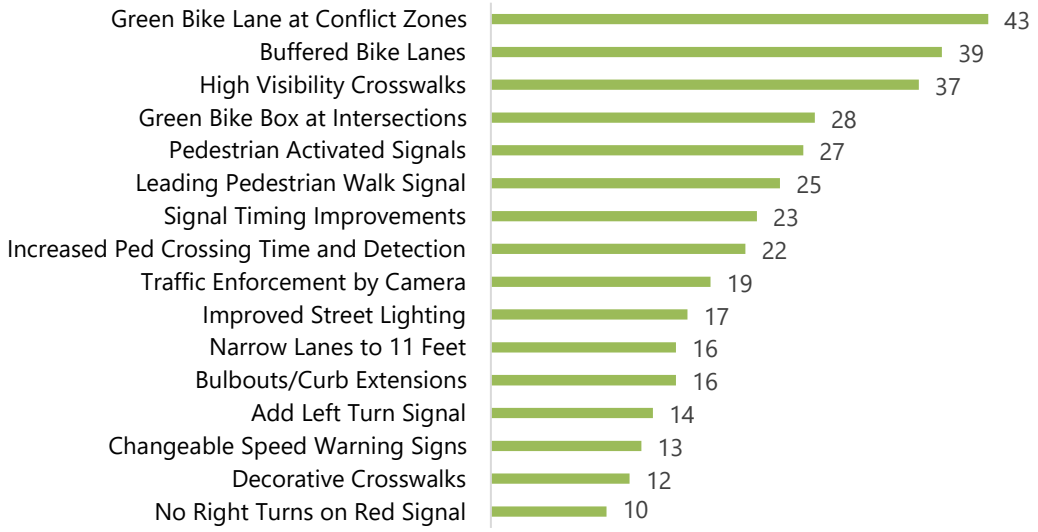
Workshop Comments

Six out of 13 comments at Priority Location #9 were recommendations to add buffered bike lanes or protected bike lanes, and two comments recommended a "road diet" or traffic calming. Participants also noted the need for crossing enhancements such as a HAWK signal at Linnet Lane, pedestrian scramble, and curb extensions to improve pedestrian safety.

Survey Results

Online survey responses for Priority Location #9 are shown in **Figure 11**. The top three recommended countermeasures at this location were green bike lanes at conflict zones, buffered bike lanes, and high visibility crosswalks.

Figure 11. Online Survey Responses, Priority Location #9



Survey Comments

Respondents recommended adding protected left turns from Homestead onto Heron, increasing signage and lane geometry paint in advance of intersections, and restricting driveways in and out of the shopping center for Priority Location #9.

In regards to part-time bike lanes and pedestrian crossings, one commenter noted:

> *"[Add] full-time bike lanes. The part-time bike lanes are confusing and discouraging for bikers. We also need a pedestrian crossing at Linnet Lane."*

Priority Location #10: Mary Avenue between Remington Drive and Fremont Avenue

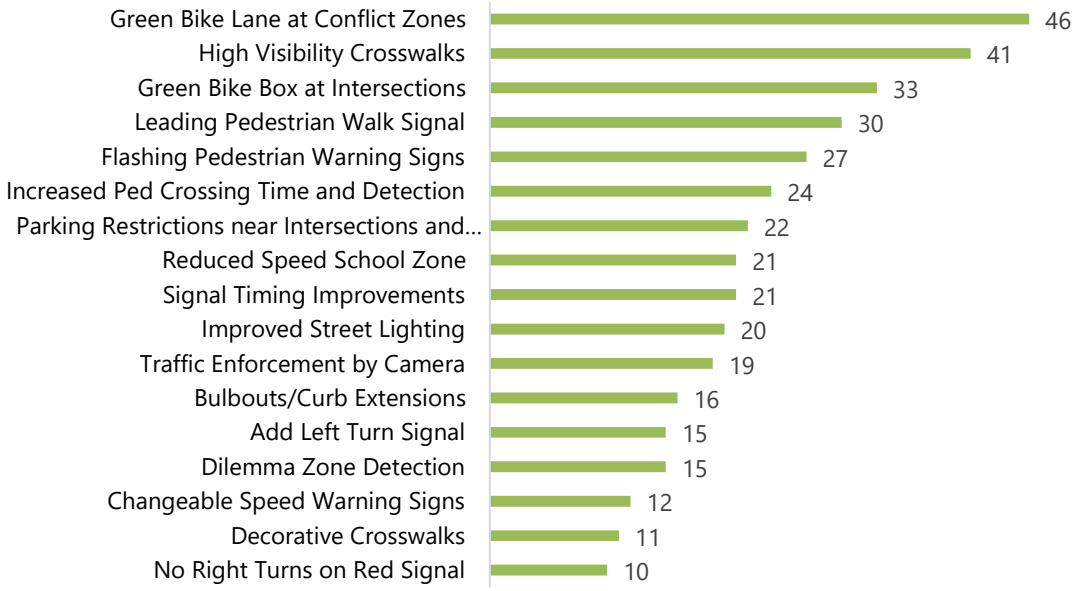
Workshop Comments

Comments at Priority Location #10 focused on bicycle safety improvements, such as buffered bike lanes, protected bike lanes, bike boxes, and consistent bicycle lanes along the corridor. Additional suggestions included LPIs, pedestrian scrambles, rumble strips or Botts' dots to separate motorists from pedestrians and bicyclists, parking restrictions, and speed enforcement.

Survey Results

Figure 12 shows that green bike lanes at conflict zones, high visibility crosswalks, and green bike boxes at intersections were the preferred countermeasure treatments at Priority Location #10.

Figure 12. Online Survey Responses, Priority Location #10



Survey Comments

Survey comments for Priority Location #10 included the suggestion to add school zoning infrastructure such as signage and roadway paint along Mary Avenue in addition to the segment of Mary near Knickerbocker Drive currently designated as a school zone.

Regarding bicycle infrastructure, one commenter noted that:

> *"It can be dark and hard to be seen when biking here. More visible bike lanes would help at intersections."*

DRAFT SAFETY STRATEGIES

Workshop participants were asked to vote on draft citywide safety strategies that the City of Sunnyvale could incorporate into the Vision Zero Plan. Strategies that received one or more vote are shown in **Table 1**. A table showing all of the potential safety strategies presented at the workshop, including those that received no votes, are included in **Attachment 1**.

Table 1. Draft Safety Strategies Feedback

A. Vision Zero Program	***Votes***
Incorporate Vision Zero safety principles into future City plans and design documents.	1
Identify a permanent, dedicated funding source for Vision Zero implementation and coordination	1
Improve data collection on speed, impairment, cell phone use, and distraction for KSI collisions.	1
B. Street Design and Operation	
Install one low-cost safety improvement per year, such as new road markings, signs, and minor signal modification.	1
C. Dangerous Behaviors	
Launch high-visibility education PSA campaigns against speeding, distracted driving, impaired driving, and other high-risk behaviors. Campaigns will focus on HIN corridors	1
Support state Automated Speed Enforcement legislation	1
Integrate Vision Zero curriculum into Police Academy curriculum and in-service Public Safety Officer training	1
Explore opportunities to expand free or subsidized transit fares during holidays and for special events	1
Develop public promotional campaign to encourage late-night transit, taxi, rideshare, and other services to provide alternatives to impaired driving.	1
D. Vulnerable Road Users	
Continue building and improving the bicycle network consistent with the Sunnyvale Bicycle Plan and Santa Clara Countywide Bike Plan	1
Host traffic safety classes for pedestrians over 60 and children.	1
Implement reduced speed limits (15 MPH) on the streets adjacent to City schools	2

ATTACHMENT 1. VOTING BOARDS RESULTS

Table 2. Potential Safety Strategies Votes by Category

	A. Vision Zero Program	Votes
External Initiatives	Put Vision Zero on the agenda of the City's public, community group, and stakeholder meetings in 2018.	
	Launch online, interactive crash data map and website.	
	Incorporate Vision Zero safety principles into future City plans and design documents.	1
	Develop a workshop for Communications Department on how to best communicate about traffic crashes and roadway safety.	
	Identify a permanent, dedicated funding source for Vision Zero implementation and coordination.	1
Data Collection & Program Evaluation	Publish an annual report to measure progress against the goals of the Action Plan.	
	Provide training for Department of Public Safety to improve collision data reporting, and preserve crash details and site evidence.	
	Improve data collection on speed, impairment, cell phone use, and distraction for KSI collisions.	1
	Establish regular pedestrian and bicyclist counts at consistent locations.	
	B. Street Design and Operation	
High Injury Network Infrastructure	Develop designs and secure grant funding for ten priority project locations identified in plan, with a focus on roadway designs to improve safety.	
	Develop prioritized list of additional safety projects.	
	Install one low-cost safety improvement per year, such as new road markings, signs, and minor signal modification.	1
Operations	Convene local stakeholders near high-crash corridors for input on project development.	
	Update City signal timing plans to improve safety for all modes (e.g. all red time, pedestrian crossing times).	
Policies & Design	Establish internal process for Vision Zero countermeasures to be evaluated and implemented, where feasible, on projects on the HIN.	
	C. Dangerous Behaviors	
Education and Outreach	Launch high-visibility education PSA campaigns against speeding, distracted driving, impaired driving, and other high-risk behaviors. Campaigns will focus on HIN corridors.	1
	Increase the use of speed feedback signs to discourage speeding.	
	Deter impaired driving by targeting education and outreach at alcohol-serving establishments.	
Enforcement	Support state Automated Speed Enforcement legislation.	1
	Integrate Vision Zero curriculum into Police Academy curriculum and in-service Public Safety Officer training.	1

Providing Alternatives to Driving	Explore opportunities to expand free or subsidized transit fares during holidays and for special events.	1
	Develop public promotional campaign to encourage late-night transit, taxi, rideshare, and other services to provide alternatives to impaired driving.	1
D. Vulnerable Road Users		
Bicycles and Pedestrians	Continue building and improving the bicycle network consistent with the Sunnyvale Bicycle Plan and Santa Clara Countywide Bike Plan.	1
	Install pedestrian countdown timers at every signalized crossing location in the City.	
	Install or upgrade pedestrian crossing treatments on the HIN.	
	Complete projects that improve bicycle pedestrian safety related to turning vehicles at intersections.	
Children and Seniors	Implement reduced speed limits (15 MPH) on the streets adjacent to City schools.	2
	Install high-visibility crosswalks near City schools.	
	Develop public service announcement campaign aimed at drivers to increase safety for pedestrians age 60+.	
	Host traffic safety classes for pedestrians over 60 and children.	1

B. SUMMARY OF COLLISION TRENDS

SUNNYVALE VISION ZERO

Project Introduction & Existing Collision Trends

Community Workshop

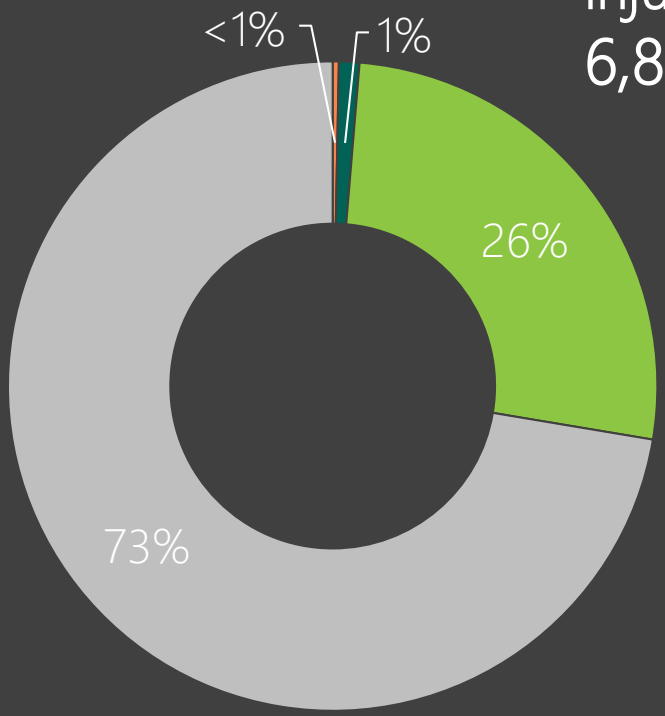
October 5, 2017

COLLISION TRENDS

ALL COLLISIONS

City of Sunnyvale, 2012 - 2016

91 collisions with a fatality (21) or severe injury (70) between 2012 and 2016, out of 6,875 total collisions.



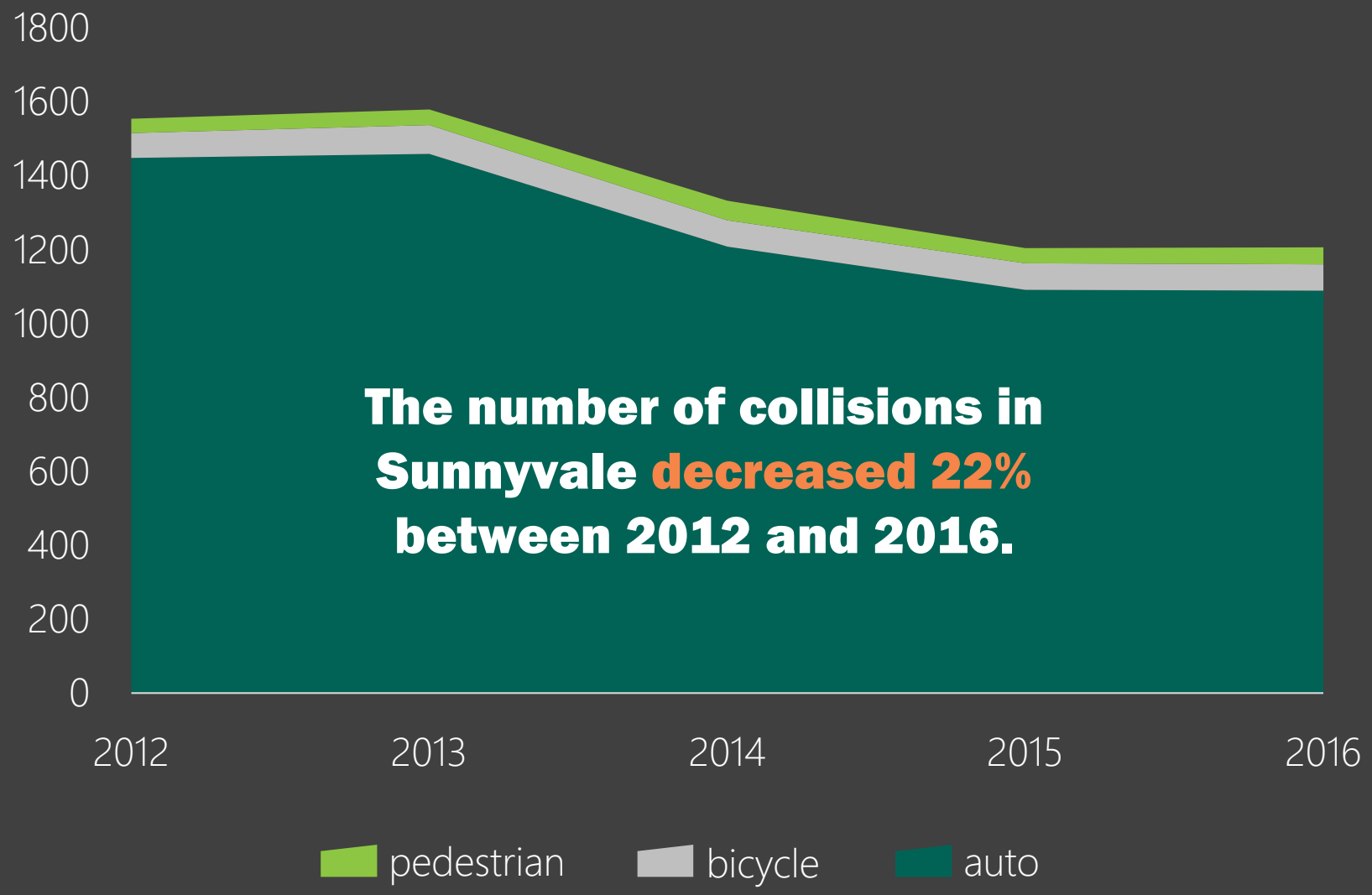
fatality severe injury non-severe injury non-injury

Sunnyvale has fewer collisions than 80% of cities of comparable size (120,000 to 160,000 population).

Source: California Office of Traffic Safety (OTS) Injury and Fatal Rankings (2014)

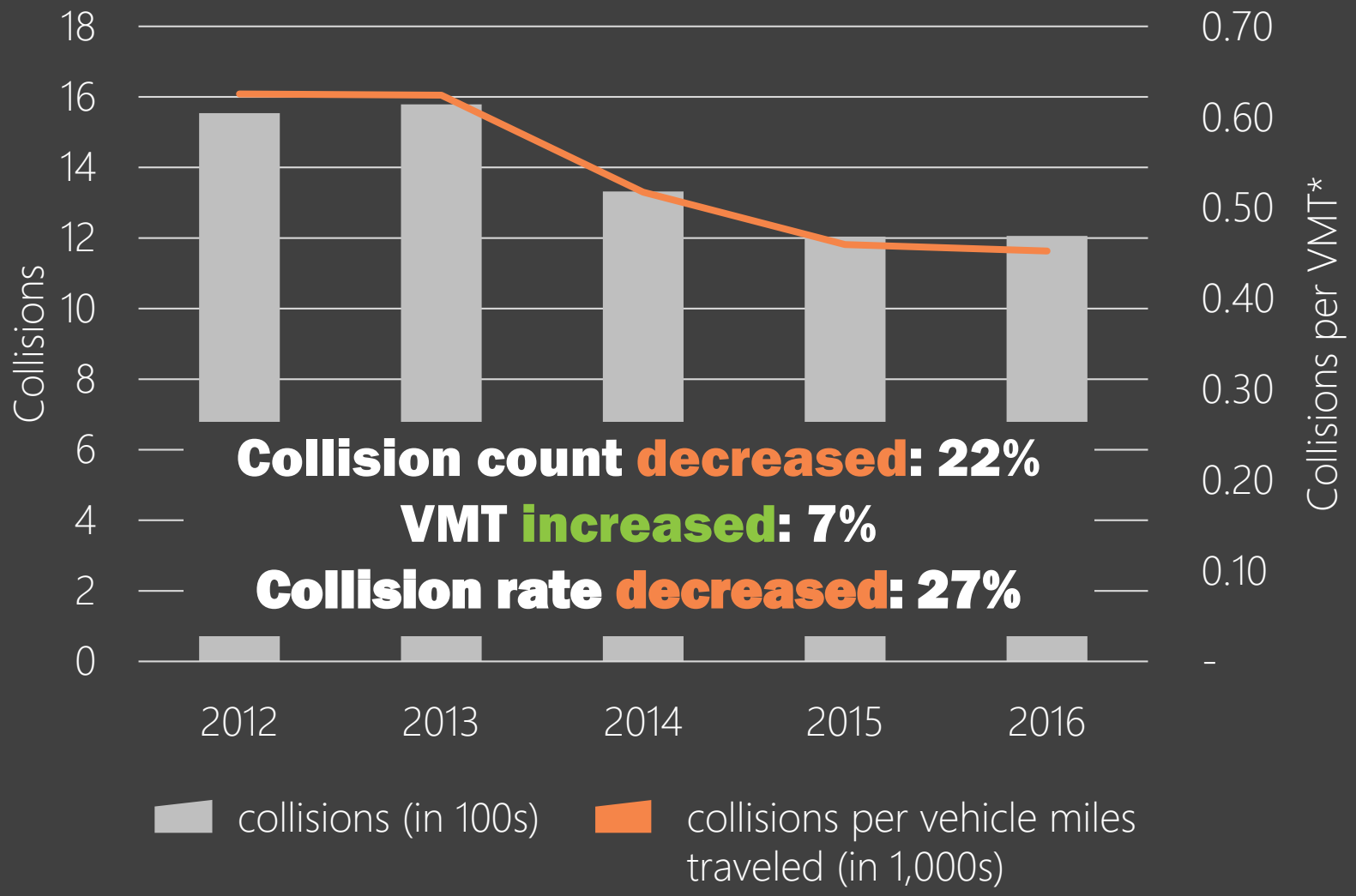
ALL COLLISIONS

City of Sunnyvale, 2012 - 2016



ALL COLLISIONS & DAILY VMT

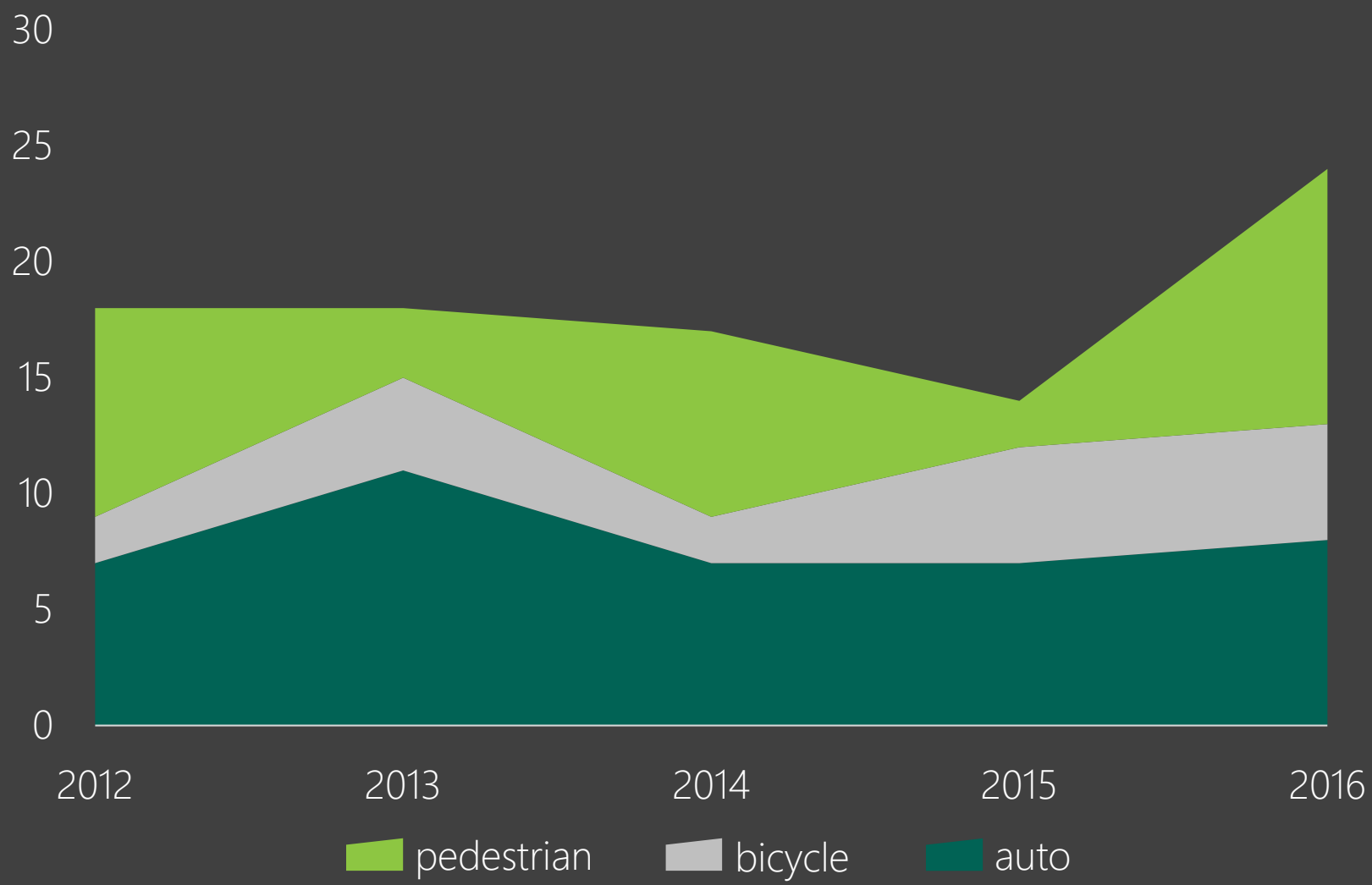
City of Sunnyvale, 2012 - 2016



*Source: City of Sunnyvale Travel Model

KSI COLLISIONS

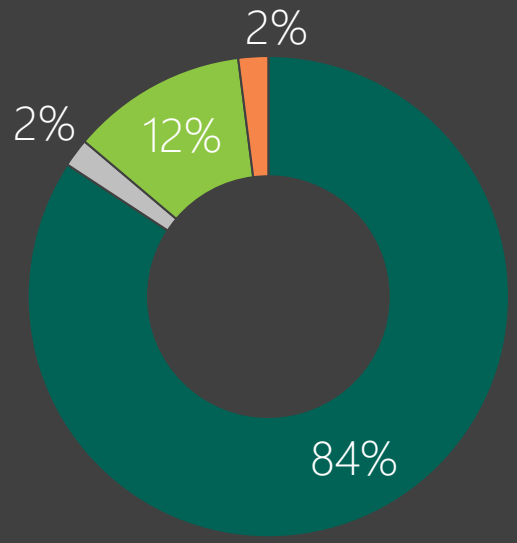
City of Sunnyvale, 2012 - 2016



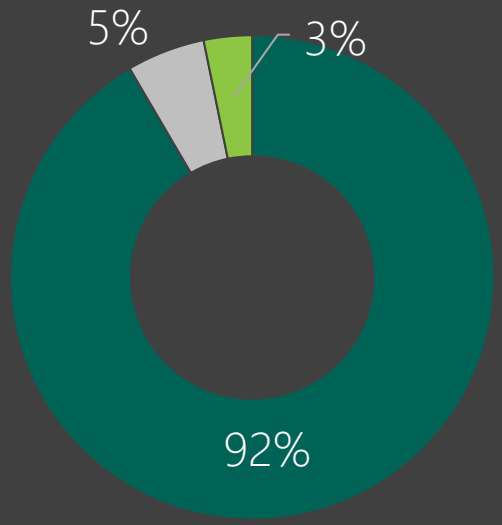
MODE SPLIT

City of Sunnyvale, 2012 - 2016

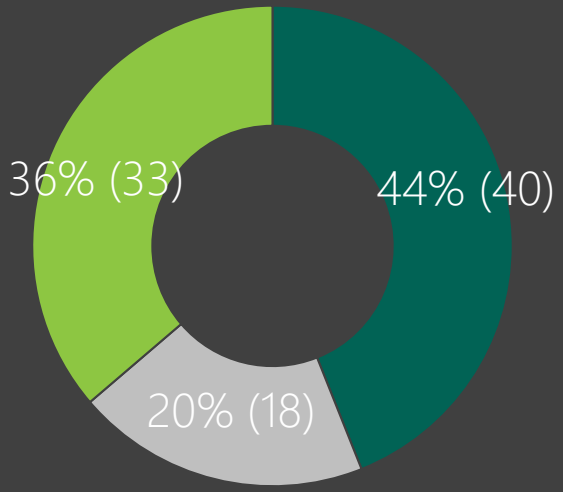
TOTAL TRIPS*



ALL COLLISIONS



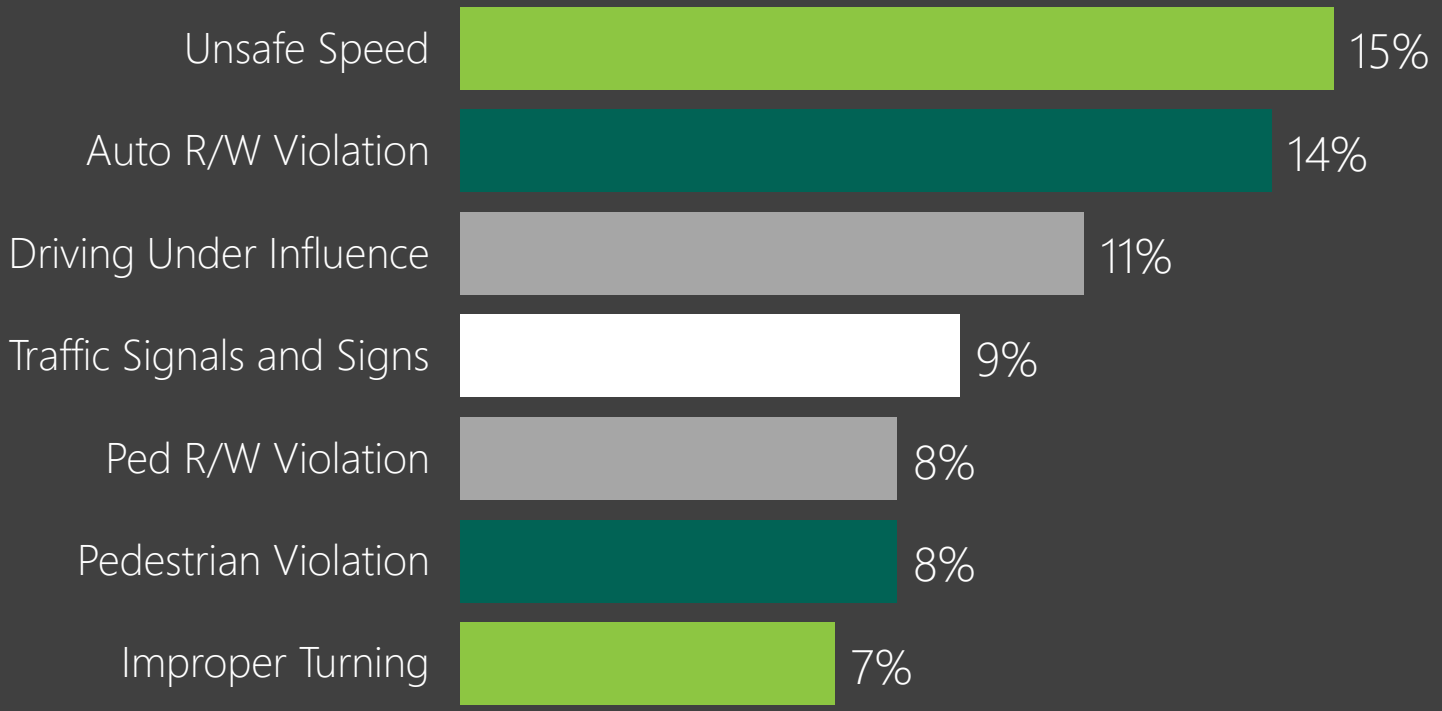
KSI COLLISIONS



pedestrian bicycle auto transit

*Source: California Household Travel Survey, 2012

Top Factors Leading to KSI Collisions (All Modes)



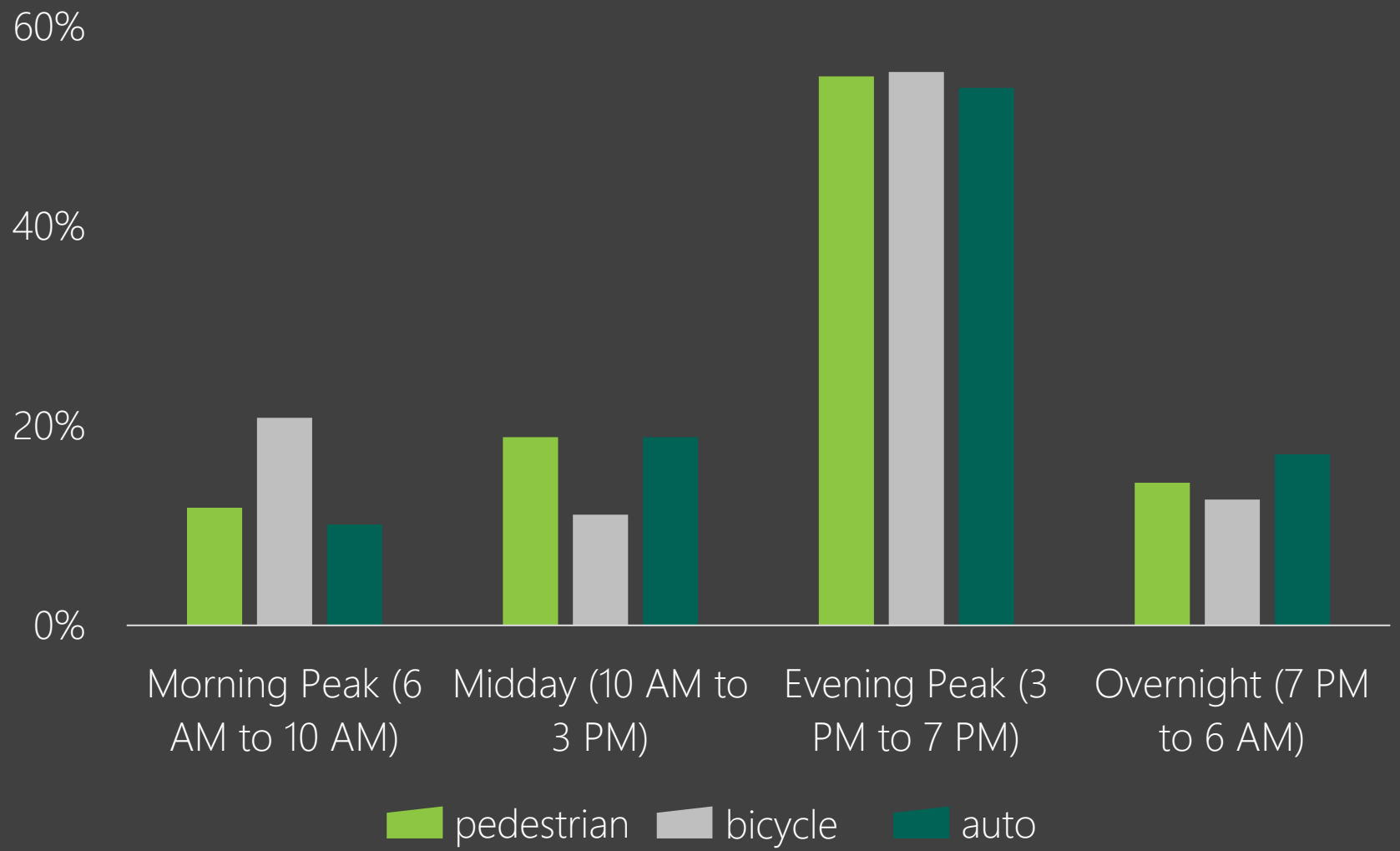
In Sunnyvale...

In one third of pedestrian KSI collisions, the pedestrian is recorded at fault

In half of bicycle KSI collisions, the bicyclist is recorded at fault

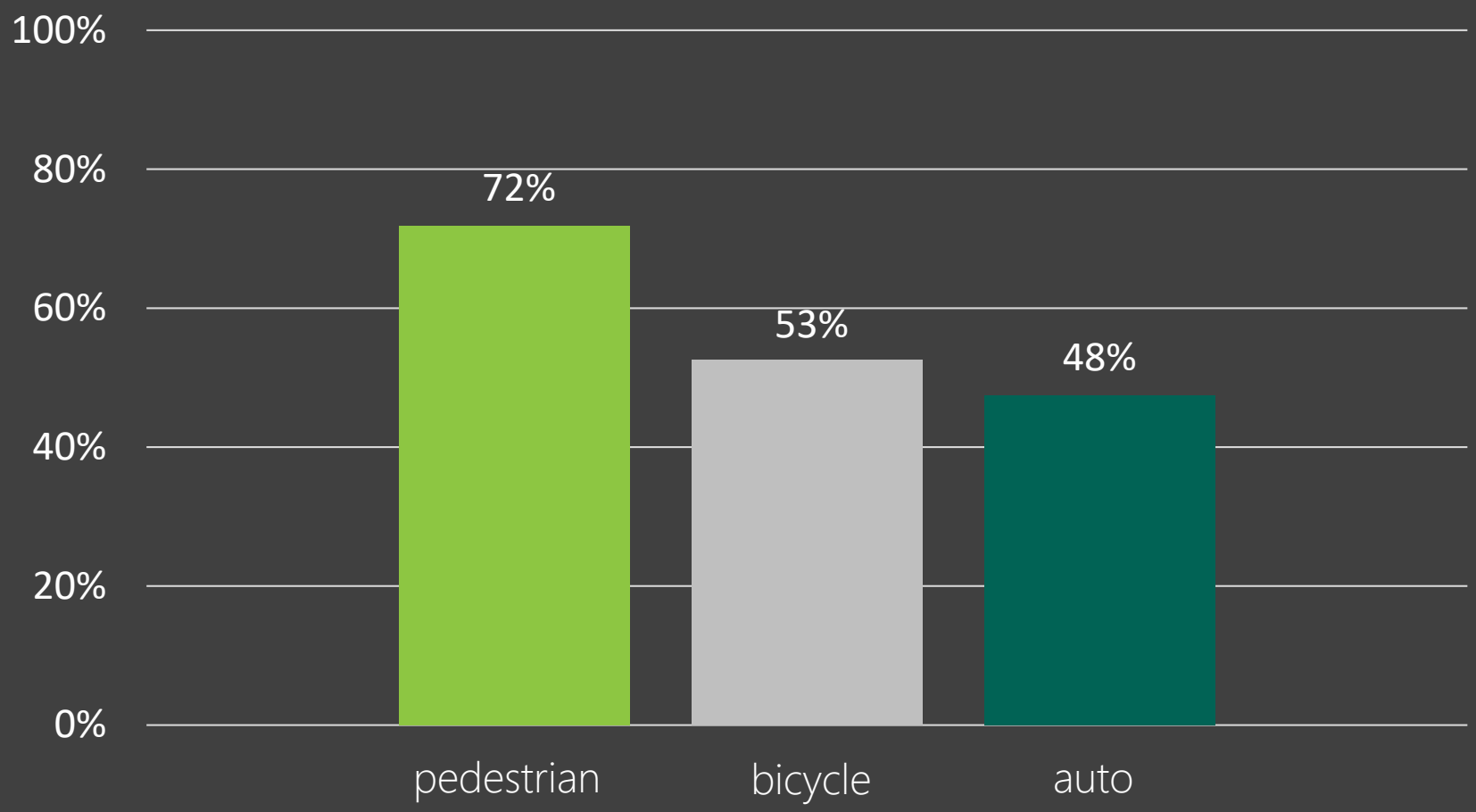
TIME OF DAY

City of Sunnyvale, 2012 - 2016, KSI Collisions



AT INTERSECTION

City of Sunnyvale, 2012 - 2016, KSI Collisions



HIGH INJURY NETWORK

The HIN accounts for nearly 60% of all fatal and severe injury collisions, on 10% of the roadway network in Sunnyvale

C. COLLISION PROFILES AND COUNTERMEASURE PAIRINGS

Collision Profile Countermeasure Matrix

Countermeasure Categories	Countermeasures	Collision Profiles									
		1	2	3	4	5	6	7	8	9	10
		Bicycle & Pedestrian	Pedestrian	All Modes	All modes	Pedestrian	All Modes	Bicycle	All Modes	All Modes	Bicycle & Pedestrian
		Walking or bicycling on expressway, arterial or collector	Unmarked pedestrian crossing	Speed-related conflict	Left turn at signalized intersection	60+ year old pedestrian at intersection	Influence of drugs or alcohol	Midblock bicycle conflict	Conflicting through movement at intersection	Child walking or biking near school	Red light violation at signalized intersection
Signalization	Dilemma Zone Detection			x							x
	Pedestrian Countdown Signal Head	x				x				x	
	Increase Pedestrian Crossing Time, Pedestrian Detection	x			x	x				x	
	Leading Pedestrian Interval	x			x	x				x	
	New Traffic Signals	x		x		x				x	
	Pedestrian Hybrid Beacon	x	x			x				x	
	Pedestrian-Activated Crosswalk Sign		x			x				x	
	Pedestrian-Activated Crosswalk Beacon		x			x				x	
	Signal Timing Improvements (including extend all-red time)	x		x	x	x			x		x
Geometric	Bulbouts/ Curb Extensions	x	x	x	x	x				x	
	Sidewalk/Pathway to Close Gap	x								x	
	Consolidate Driveways	x						x		x	
	Narrow Lanes (11' minimum per Sunnyvale standards)	x		x				x			
	Pedestrian Refuge Islands/ Medians	x		x		x				x	
	Separated Bikeways (Cycle tracks)	x		x				x		x	
	Road Diets	x		x	x	x		x		x	
	Shared-Use/ Bicycle Path	x						x		x	

Countermeasure Categories	Countermeasures	Collision Profiles									
		1	2	3	4	5	6	7	8	9	10
		Bicycle & Pedestrian	Pedestrian	All Modes	All modes	Pedestrian	All Modes	Bicycle	All Modes	All Modes	Bicycle & Pedestrian
		Walking or bicycling on expressway, arterial or collector	Unmarked pedestrian crossing	Speed-related conflict	Left turn at signalized intersection	60+ year old pedestrian at intersection	Influence of drugs or alcohol	Midblock bicycle conflict	Conflicting through movement at intersection	Child walking or biking near school	Red light violation at signalized intersection
Signs, Markings, Operational	Bike Box				x						
	Bike Intersection Markings				x				x		
	Bike Lane							x		x	
	Buffered Bike Lanes	x						x		x	
	Controlled Intersections/ New Stop Signs/ Convert 2-Way to 4-Way Stops		x	x					x	x	
	Green Paint/ Conflict Zones	x			x						
	High Visibility Crosswalks with Advance Stop or Yield Lines	x	x			x				x	
	Intersection, Street-Scale Lighting	x	x		x					x	
	Marked Crossings (unsignalized intersections)	x	x			x				x	
	Parking restrictions near intersections (nearside locations)	x	x			x			x	x	
	Protected Turns (turn pockets and protected or split signal phasing)	x		x	x	x					
	Restrict or Prohibit Turns (including Right Turn on Red Restriction)	x			x	x					
Speed Control Measures, Miscellaneous	Dynamic/Variable Speed Warning Signs	x		x						x	
	Speed Humps			x				x			
	Reduced Speed School Zone	x		x						x	
Education	Education, PSAs	x	x	x			x	x		x	x
Enforcement	Video enforcement for red light running and speeding	x		x							x
	Enforcement, More Officers	x	x	x			x	x		x	x

D. PRIORITY PROJECT CUT SHEETS (10)

El Camino Real between S. Mary Avenue and S. Mathilda Avenue

SunnyvaleVisionZero
Priority Project Location 1

This study area extends 0.7 miles along El Camino Real between S. Mary Avenue and S. Mathilda Avenue. The project area is served by VTA Bus Routes 22 and Rapid 522, and major destinations in the vicinity of the corridor include Sunnyvale City Hall, Holiday Inn, Grand Hotel, and food services. El Camino Real in this section is generally 6 lanes with a speed limit of 40 miles per hour. There were 260 collisions on the project corridor between 2012 and 2016, including four severe/fatal collisions. Collisions on the corridor often involved speed. Other notable collision patterns were people walking or bicycling on the arterials, left turns at signalized intersections and red light violations at signalized intersections.

Note: Collision locations are shown diagrammatically based upon distance from the reported intersection. The exact travel lane or location in the roadway for each collision is not reflected.

KSI Vehicle Collision | KSI Bicycle Collision | KSI Pedestrian Collision | Non-KSI Collision

Collision History (2012-2016)

235

14

11

Notable Collision Patterns

31% Speed-related conflict

10% Walking or bicycling on expressway, arrterial, or collector

8% Left turn at signalized intersection

8% Red light violation at signalized intersection

Potential Improvements

Mary Avenue Pedestrian Crossing

Data indicate one pedestrian-involved KSI collision occurred on Mary Avenue at an unmarked crossing in the project area. There are currently no marked crossings on Mary Avenue between El Camino Real and Iowa Avenue, a segment over 1,300' in length with fronting uses including Sunnyvale Christian School and Skywalk Bible Church. A new marked pedestrian crossing north of Olive Avenue would improve connectivity and safety. If provided, a new crossing should include a high-visibility crosswalk, advance limits lines, median refuge island, and pedestrian hybrid beacon (PHB), or pedestrian signal. Alternately, crosswalks could be installed at the intersection of Mary Avenue and Olive Avenue with all-way stop or traffic signal control. Any modifications would require evaluation and completion of appropriate engineering studies

El Camino Real Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along El Camino Real, including:

- Elimination of on-street parking
- Lane width reductions to 11' where feasible
- Buffered bike lanes
- Green pavement markings in conflict zones
- Directional curb ramps to assist pedestrians with visual impairment
- Speed feedback signs and enforcement
- Median fencing where feasible

Signalized Intersection Improvements

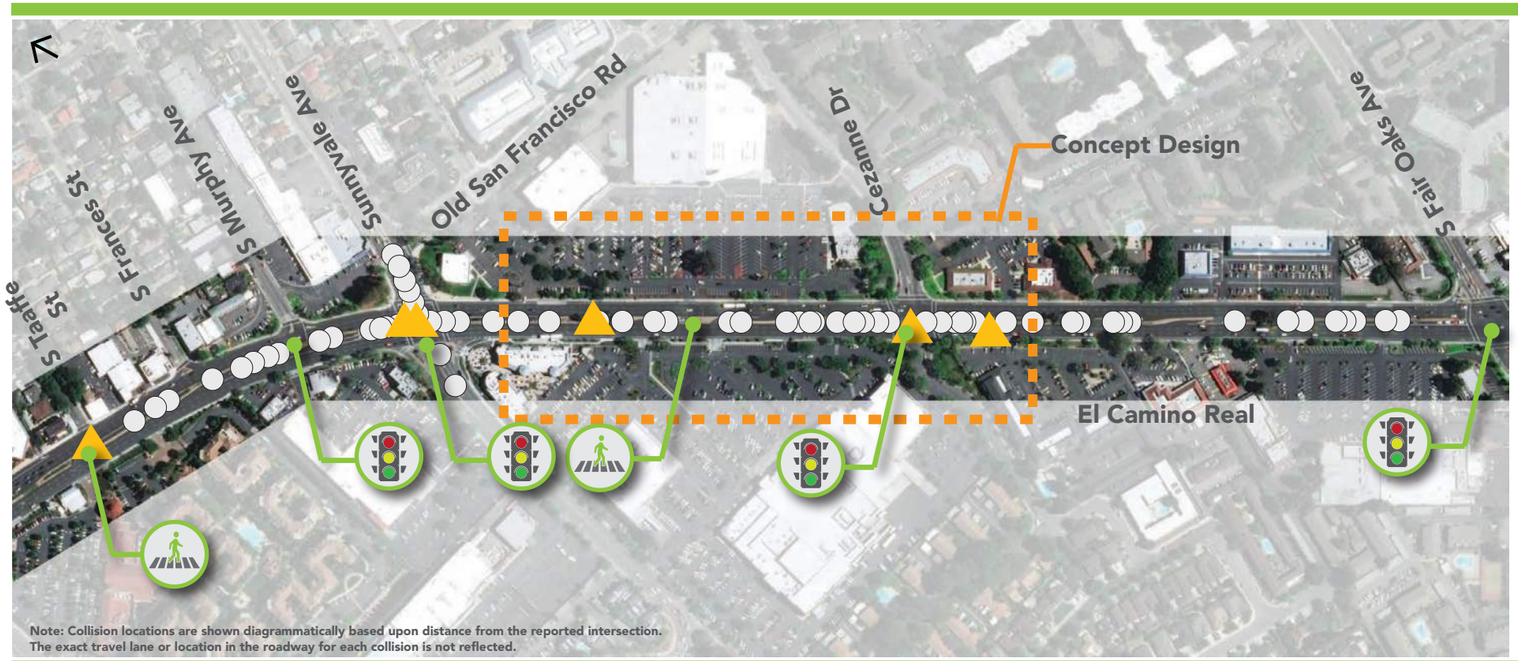
A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- High-visibility crosswalks
- Accessible pedestrian signals (APS) with countdown timers
- Adaptive pedestrian signal systems
- Bicycle detection improvements
- Leading pedestrian intervals (LPI)
- 12" vehicle signal heads
- Median pedestrian refuge islands on El Camino Real
- Curb extensions to reduce turning radii
- Green two-stage bicycle queue boxes where feasible

El Camino Real between S. Taaffe Street and S. Fair Oaks Avenue

SunnyvaleVisionZero
Priority Project Location 2

This study area extends 0.7 miles along El Camino Real between S. Taaffe Street and S. Fair Oaks Avenue. The project area is served by VTA Bus Routes 22 and Rapid 522, and major destinations in the vicinity of the corridor include Allario Shopping Center, Helios School, Sprouts Farmers Market, Safeway, CVS, Pediatrics Sunnyvale Center, and food services. El Camino Real in this section is generally 6 lanes with a speed limit of 40 miles per hour. There were 173 collisions on the project corridor between 2012 and 2016, including six severe/fatal collisions. Collisions on the corridor often involved speed. Other notable collision patterns were people walking or bicycling on the arterials, left turns at signalized intersections and red light violations at signalized intersections.



KSI Vehicle Collision ▲ KSI Bicycle Collision ▲ KSI Pedestrian Collision ▲ Non-KSI Collision ○

Collision History (2012-2016)

145

14

14

Notable Collision Patterns

27% Speed-related conflict

16% Walking or bicycling on expressway, arterial, or collector

9% Left turn at signalized intersection

8% Red light violation at signalized intersection

Potential Improvements

El Camino Real Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along El Camino Real including:

- Lane width reduction to 11' where feasible
- Buffered bike lane where feasible
- Green pavement marking in conflict zone
- Speed feedback signs and traffic enforcement
- Improved street lighting
- Directional curb ramps to assist pedestrians with visual/physical impairment where feasible
- Faded sign replacement/extraneous sign removal
- Planting strip to separate sidewalk from roadway
- Bus/bike conflicts to be reduced where possible
- Transit amenity improvements
- High-visibility crosswalks
- Curb extensions to reduce curb radii
- Median fencing where feasible

Signalized Intersection Improvements

A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- Straighten crosswalks
- Accessible pedestrian signals (APS) with countdown timers
- Adaptive pedestrian signal systems
- Bicycle detection
- Leading Pedestrian Intervals (LPI)
- Median pedestrian refuge island
- More vehicle signal heads to improve visibility
- Possible elimination of right-turn pork chop island on south-east corner of the El Camino Real and S. Fair Oaks Avenue intersection
- Protected left turns and turn lanes on Cezanne Drive
- Bike box on southbound Cezanne Drive

Midblock crossing on El Camino Real

Data indicate pedestrian-involved KSI collisions occurred on this segment of El Camino Real. Midblock crosswalks along with enhanced crossing treatments, if warranted, should be considered to improve crossing safety for pedestrians at these locations. Treatments may include:

- Midblock high-visibility crosswalks with traffic signal or pedestrian hybrid beacon
- Median pedestrian refuge island
- Advance limit lines

Note: See Appendix E for corresponding conceptual layout.

El Camino Real, E. Fremont Avenue, and S. Wolfe Road

SunnyvaleVisionZero
Priority Project Location 3

This study location includes the area immediately surrounding the intersection complex at El Camino Real, E. Fremont Avenue, and S. Wolfe Road. The project location is served by VTA Bus Route 22, 26, and Rapid 522, and major destinations in the vicinity of the corridor include Golfland USA, Sunken Gardens Golf Course, food services, and Wild Palms Hotel. Each major roadway in the study area is 4 to 6 lanes wide with auxiliary turn lanes. There were 175 collisions in the study area between 2012 and 2016, including two severe/fatal collisions. Other notable collision patterns were left turns at signalized intersections, influence of drugs or alcohol, and red light violations at signalized intersections.

Note: Collision locations are shown diagrammatically based upon distance from the reported intersection.
The exact travel lane or location in the roadway for each collision is not reflected.

KSI Vehicle Collision ▲ KSI Bicycle Collision ▲ KSI Pedestrian Collision ▲ Non-KSI Collision ○

Collision History (2012-2016)

Notable Collision Patterns

Potential Improvements

Area-wide Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along El Camino Real, Fremont Avenue and Wolfe Road, including:

- Lane width reduction to 11' where feasible
- Buffered bike lanes where feasible
- Green pavement marking in conflict zones
- Directional curb ramps to assist pedestrians with visual impairment
- Speed feedback signs and enforcement
- Improved street lighting

Signalized Intersection Improvements

A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- Curb extensions to reduce curb radii
- High visibility crosswalks
- Pedestrain refuge island
- Leading Pedestrain Interval (LPI)
- Restrict or prohibit permissive left turns
- Accessible Pedestrian Signal (APS) with countdown timers
- Passive in-crosswalk pedestrian detection
- Bicycle detection
- Green two-stage queue boxes where feasible

Remington Drive/Fair Oaks Avenue between Iris Avenue and Manet Drive

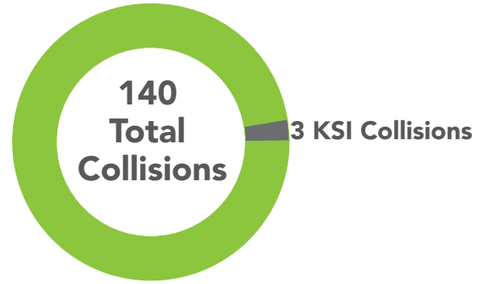
SunnyvaleVisionZero
Priority Project Location 4

This study area extends 0.4 miles along Remington Drive between Iris Avenue and Manet Drive. The project area is served by VTA Bus Routes 22, 55 and Rapid 522, and major destinations in the vicinity of the corridor include Sunnyvale Community Center Park, food services, and offices. Remington Drive is generally 5 lanes wide in this section with a speed limit of 35 miles per hour. There were 140 collisions on the project corridor between 2012 and 2016, including three severe/fatal collisions. Collisions on the corridor often involved speed. Other notable collision patterns were people walking or bicycling on the arterial, left turns at signalized intersections and conflicting through movements at intersections.

Note: Collision locations are shown diagrammatically based upon distance from the reported intersection. The exact travel lane or location in the roadway for each collision is not reflected.

KSI Vehicle Collision | KSI Bicycle Collision | KSI Pedestrian Collision | Non-KSI Collision

Collision History (2012-2016)



117

9

14

Notable Collision Patterns

28% Speed-related conflict

16% Walking or bicycling on expressway, arterial, or collector

6% Conflicting through movement at intersection

5% Left turn at signalized intersection

Potential Improvements

Remington Drive Pedestrian Crossing

Data indicate one pedestrian-involved KSI collision occurred on Remington Drive at the Michelangelo Drive uncontrolled crossing. Enhanced crossing treatments, if warranted, should be considered to improve crossing safety for pedestrians. These treatments may include:

- Median pedestrian refuge island
- Advance limit or yield lines
- Flashing beacons, pedestrian hybrid beacon (PHB), or traffic signal

S. Fair Oaks Avenue and Remington Drive Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along the corridor, including:

- Elimination of on-street parking
- Lane width reductions to 11' where feasible
- Buffered bike lanes where feasible
- Green pavement markings in conflict zones
- Directional curb ramps to assist pedestrians with visual impairment
- Speed feedback signs and enforcement

Signalized Intersection Improvements

A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- High-visibility crosswalks
- Accessible pedestrian signals (APS) with countdown timers
- Increased pedestrian crossing time
- Adaptive pedestrian signal systems
- Bicycle detection improvements
- Leading pedestrian intervals (LPI)
- 12" vehicle signal heads
- Median pedestrian refuge islands
- Curb extensions to reduce turning radii
- Green two-stage queue boxes where feasible

El Camino Real between Henderson Avenue and Helen Avenue

SunnyvaleVisionZero
Priority Project Location 5

This study area extends 0.3 miles along El Camino Real between Henderson Avenue and Helen Avenue. The corridor is served by VTA Bus Routes 22 and Rapid 522, and major destinations in the vicinity of the corridor include Peterson Middle School and food and shopping services. El Camino Real is 6 lanes wide in this section with a speed limit of 35 miles per hour. There were 121 collisions on the project corridor between 2012 and 2016, including four severe/fatal collisions. Collisions on the corridor often involved speed. Other notable collision patterns were people walking or bicycling on the arterial, influence of drugs or alcohol and left turns at signalized intersections.

Note: Collision locations are shown diagrammatically based upon distance from the reported intersection. The exact travel lane or location in the roadway for each collision is not reflected.

KSI Vehicle Collision | KSI Bicycle Collision | KSI Pedestrian Collision | Non-KSI Collision

Collision History (2012-2016)

Notable Collision Patterns

Potential Improvements

El Camino Real Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along El Camino Real, including:

- Buffered bike lanes where feasible
- Elimination of on-street parking
- Lane width reductions to 11' where feasible
- Green pavement markings in conflict zones
- Directional curb ramps to assist pedestrians with visual impairment
- Speed feedback signs and enforcement
- Wider sidewalk
- Median fencing to discourage jaywalking where feasible
- Crossing supervision, if warranted.

Signalized Intersection Improvements

A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at the intersection of El Camino Real and Henderson Avenue:

- Curb extensions to reduce curb radii
- High visibility crosswalk with advance limit line
- Bike boxes where feasible
- Leading Pedestrian Interval (LPI)
- Side-street left-turn lanes with protected phasing
- Accessible Pedestrian Signal (APS) with countdown timers
- Adaptive pedestrian signal systems
- Bicycle detection
- 12” vehicle signal heads
- Parking restrictions near intersection
- Increased pedestrian crossing time

Uncontrolled Crossing at Helen Avenue

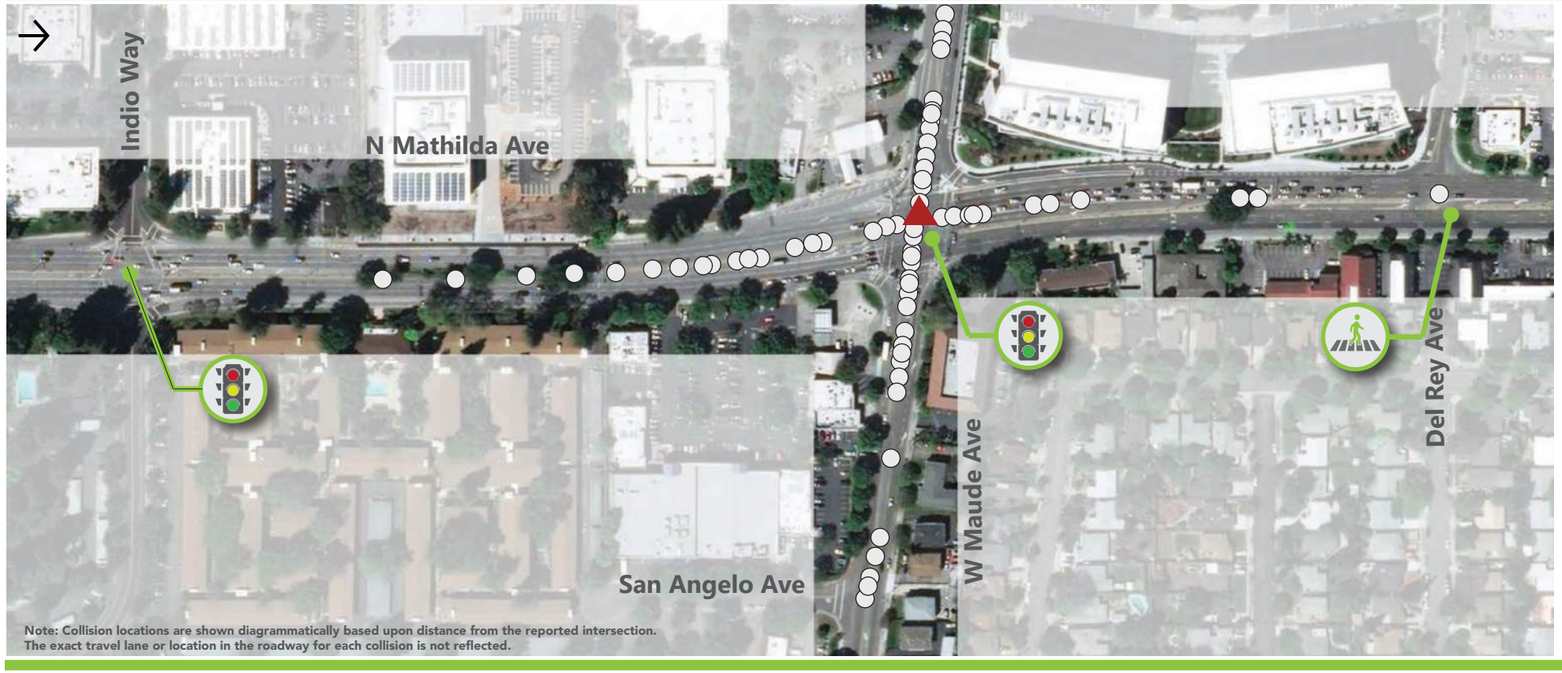
Data indicate two KSI collisions occurred on El Camino Real at or near the Helen Avenue uncontrolled crossing. Enhanced crossing treatments, if warranted, should be considered to improve crossing safety for pedestrians. These treatments may include:

- High visibility crosswalks
- Median pedestrian refuge island
- Flashing beacons, pedestrian hybrid beacon (PHB), or traffic signal

N. Mathilda Avenue and W. Maude Avenue

SunnyvaleVisionZero
Priority Project Location 6

This study area extends 0.3 miles along N. Mathilda Avenue between Del Rey Avenue and Indio Avenue and 0.2 miles along W. Maude Avenue between Mathilda Avenue and San Angelo Avenue . The corridor is served by VTA Bus Route 54, and major destinations in the vicinity of the corridor include offices such as Apple and LinkedIn buildings, food services, and Trinity Church of Sunnyvale. N. Mathilda Avenue width in this section varies between 6 to 11 lanes with a speed limit of 45 miles per hour. There were 106 collisions in this study area between 2012 and 2016, including one severe/fatal collision. Collisions on the corridor often involved speed. Other notable collision patterns were left turns at signalized intersections, people walking or bicycling on arterials, and influence of drugs or alcohol.



Note: Collision locations are shown diagrammatically based upon distance from the reported intersection. The exact travel lane or location in the roadway for each collision is not reflected.

KSI Vehicle Collision | KSI Bicycle Collision | KSI Pedestrian Collision | Non-KSI Collision

Collision History (2012-2016)

Notable Collision Patterns

Potential Improvements

N. Mathilda Avenue Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along N. Mathilda Avenue including:

- Lane width reduction to 11′ where feasible
- Buffered bike lane where feasible
- Green pavement marking in conflict zone
- Speed feedback signs and traffic enforcement
- Improved street lighting

Signalized Intersection Improvements

A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- High-visibility crosswalks
- Accessible pedestrian signals (APS) with countdown timers
- Increased pedestrian crossing time
- Bicycle detection
- Leading Pedestrian Intervals (LPI)
- 12" vehicle signal heads
- Curb extensions to reduce turning radii and eliminate pork chop islands where feasible
- Improved traffic signal timing
- Dilemma zone detection
- Side-street left-turn lanes with protected phasing
- Green two-stage queue boxes where feasible

Marked Crosswalk at Del Rey Avenue

Del Rey Avenue may be a candidate for a marked pedestrian crossing due to the long distance between crosswalks and connection between key destinations. This location is adjacent to a bus stop serving VTA Bus Route 54, Apple and LinkedIn buildings, motels and a residential neighborhood. The next signalized intersections to the north and south are located more than 700 feet from this crossing location. A new marked crossing south of Del Rey Avenue would improve connectivity and eliminate the need for transit riders to jaywalk across Mathilda Avenue . If provided, a new crossing should include a high-visibility crosswalk, advance limits lines, median refuge island, and pedestrian or full traffic signal.

N. Fair Oaks Avenue between Balsam Avenue and E. Taylor Avenue

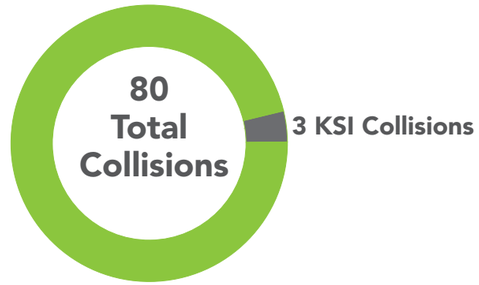
SunnyvaleVisionZero
Priority Project Location 7

This study area extends 0.3 miles along N. Fair Oaks Avenue between Balsam Avenue and E. Taylor Avenue. The corridor is served by VTA Bus Routes 26 and 55, and major destinations in the vicinity of the corridor include Fair Oaks Park and The King's Academy. N. Fair Oaks Avenue in this section is 4 lanes with turn lanes at major intersections and a speed limit of 30 miles per hour. There were 80 collisions on the project corridor between 2012 and 2016, including three severe/fatal collisions. Collisions on the corridor often involved speed. Other notable collision patterns were red light violations at signalized intersections, influence of drugs or alcohol, and conflicting through movements at intersections.

Note: Collision locations are shown diagrammatically based upon distance from the reported intersection. The exact travel lane or location in the roadway for each collision is not reflected.

KSI Vehicle Collision | KSI Bicycle Collision | KSI Pedestrian Collision | Non-KSI Collision

Collision History (2012-2016)



77
1
2

Notable Collision Patterns

28% Speed-related conflict

14% Red light violation at signalized intersection

9% Influence of drugs or alcohol

9% Conflicting through movement at intersection

Potential Improvements

N. Fair Oaks Avenue Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along N. Fair Oaks Avenue including:

- Lane width reduction to 11' where feasible
- Green pavement marking in conflict zones
- Speed feedback signs and enforcement
- Improved street lighting

Signalized Intersection Improvements

A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- High-visibility crosswalks
- Accessible pedestrian signals (APS) with countdown timers
- Adaptive pedestrian signal systems
- Bicycle detection
- Leading pedestrian intervals (LPI)
- 12" vehicle signal heads
- Curb extensions to reduce turning radii
- Parking restrictions near intersections
- Improved traffic signal timing
- Improved dilemma zone detection

Marked Crosswalks at Balsam Avenue

Balsam Avenue may be a candidate for a marked pedestrian crossing due to the long distance between crosswalks and connection between key destinations. Community workshop participants requested safety countermeasures across N. Fair Oaks Avenue to provide safe access to the Fair Oaks Park located northeast of Maude Avenue. Per their comments, there are many park users and children crossing N. Fair Oaks Avenue to access the park. If provided, a new crossing should include a high-visibility crosswalk, advance limits lines, median refuge island, and pedestrian hybrid beacon (PHB) or pedestrian signal. Any modifications would require evaluation and completion of appropriate engineering studies.

Fremont Avenue between Sunnyvale-Saratoga Road and Floyd Avenue

SunnyvaleVisionZero
Priority Project Location 8

This study area extends 0.3 miles along Fremont Avenue between Sunnyvale-Saratoga Road and Floyd Avenue. Major destinations in the vicinity of the corridor include Fremont Corners Shopping Center, St John's Lutheran Church, Fremont High School, and 24 Hour Fitness. Fremont Avenue in this section is 4 to 6 lanes with auxiliary turn lanes at major intersections and a speed limit of 40 miles per hour. There were 35 collisions on the project corridor between 2012 and 2016, including three severe/fatal collisions. Collisions on the corridor often involved speed. Other notable collision patterns were people walking or bicycling on the arterial, left turns at signalized intersections, and mid-block bicycle conflicts.

Note: Collision locations are shown diagrammatically based upon distance from the reported intersection. The exact travel lane or location in the roadway for each collision is not reflected.

KSI Vehicle Collision | KSI Bicycle Collision | KSI Pedestrian Collision | Non-KSI Collision

Collision History (2012-2016)

26
7
2

Notable Collision Patterns

29% Speed-related conflict

26% Walking or bicycling on expressway, arterial, or collector

11% Mid-block bicycle conflict

9% Left turn at signalized intersection

Potential Improvements

Fremont Avenue Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along Fremont Avenue including:

- Lane width reduction to 11' where feasible
- Buffered bike lane where feasible
- Green pavement marking in conflict zone
- Speed feedback signs and traffic enforcement
- Improved street lighting
- Directional curb ramps to assist pedestrians with visual impairment
- High-visibility crosswalks
- Reduction in median cuts to reduce turn conflicts where feasible
- Pedestrian crossing across Fremont Avenue at Floyd Avenue
- Reduction in number of lanes, where feasible

Signalized Intersection Improvements

A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- High-visibility crosswalks
- Accessible pedestrian signals (APS) with countdown timers
- Increased pedestrian crossing time
- Adaptive pedestrian signal systems
- Bicycle detection
- Leading Pedestrian Intervals (LPI)
- 12" vehicle signal heads to improve visibility
- Curb extensions to reduce turning radii
- Protected left turns and turn lanes on Manet Drive/Bobwhite Avenue
- Median pedestrian refuge island on Fremont Avenue where feasible
- Advance limit line at the intersection of Fremont Avenue and Sunnyvale-Saratoga Road

Note: See Appendix E for corresponding conceptual layout.

Homestead Road between Heron Avenue and Wolfe Road

SunnyvaleVisionZero
Priority Project Location 9

This study area extends 0.2 miles along Homestead Road between Heron Avenue and Wolfe Road. Major destinations in the vicinity of the corridor include Jesus Love Korean Church, Good Samaritan Preschool, Cupertino Village Mall, Apple Park, and food services. Homestead Road is 4 lanes wide in this section with a speed limit of 35 miles per hour. There were 28 collisions on the project corridor between 2012 and 2016, including two severe/fatal collisions. Collisions on the corridor often involved speed. Other notable collision patterns were people walking or bicycling on the arterial, mid-block bicycle conflicts, and pedestrians in unmarked pedestrian crossings.

Note: Collision locations are shown diagrammatically based upon distance from the reported intersection. The exact travel lane or location in the roadway for each collision is not reflected.

KSI Vehicle Collision | KSI Bicycle Collision | KSI Pedestrian Collision | Non-KSI Collision

Collision History (2012-2016)

23

3

2

Notable Collision Patterns

39% Speed-related conflict

18% Walking or bicycling on expressway, arterial, or collector

7% Mid-block bicycle conflict

4% Unmarked pedestrian crossing

Potential Improvements

Homestead Road Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along Homestead Road including:

- Lane width reduction to 11' where feasible
- Buffered bike lane where feasible
- Green pavement marking in conflict zones
- Speed feedback signs and enforcement
- Improved street lighting
- Directional curb ramps to assist pedestrians with visual impairment
- Painted or thermoplastic pavement markings in place of existing markers

Signalized Intersection Improvements

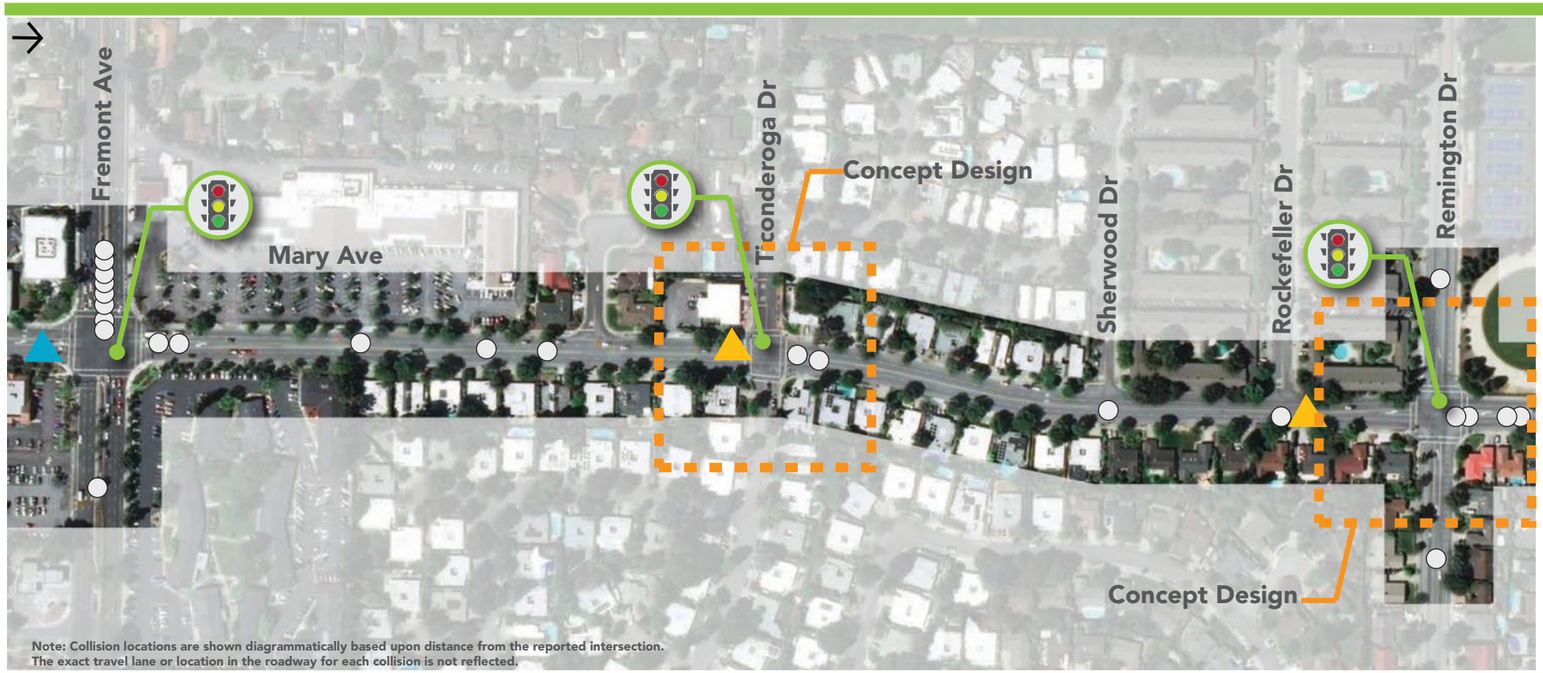
A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- High-visibility crosswalks
- Accessible pedestrian signals (APS) with count down timers
- Passive in-crosswalk pedestrian detection
- Bicycle detection
- Leading pedestrian intervals (LPI)
- 12" vehicle signal heads
- Improved traffic signal timing
- Pedestrian refuge islands where feasible
- Protected left-turn signals on Homestead Road at Heron Avenue

Mary Avenue between Remington Drive and Fremont Avenue

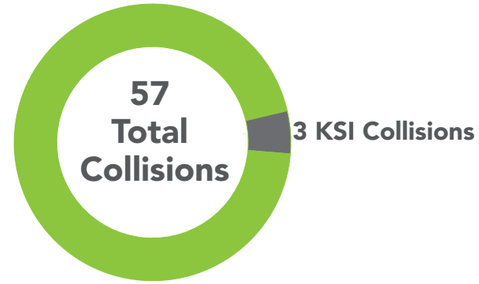
SunnyvaleVisionZero
Priority Project Location 10

This study area extends 0.5 miles along Mary Avenue between Remington Drive and Fremont Avenue. The corridor is served by VTA Bus Route 53, and major destinations in the vicinity of the corridor include Westmoor Village Shopping Center, Sunnyvale Middle School, Walgreens, banks, and offices. Mary Avenue varies between 3 and 5 lanes with a speed limit of 35 miles per hour. There were 57 collisions on the project corridor between 2012 and 2016, including three severe/fatal collisions. Collisions on the corridor often involved speed. Other notable collision patterns were people walking or bicycling on the arterial, left turns at signalized intersections, and conflicting through movements at intersections.



KSI Vehicle Collision | KSI Bicycle Collision | KSI Pedestrian Collision | Non-KSI Collision

Collision History (2012-2016)



47
8
2

Notable Collision Patterns

32% Speed-related conflict

14% Walking or bicycling on expressway, arterial, or collector

12% Left turn at signalized intersection

11% Conflicting through movement at intersection

Potential Improvements

Mary Avenue Corridor Improvements

Collision analysis and community feedback indicated that a number of corridor-wide improvements would help improve user comfort and safety along Mary Avenue including:

- Lane width reduction to 11’ where feasible
- Green pavement marking in conflict zones
- Speed feedback signs and traffic enforcement
- Improved street lighting
- Directional curb ramps to assist pedestrians with visual impairment
- ADA upgrades to meet current standards at all locations
- Southbound speed feedback sign near Sherwood Drive

Signalized Intersection Improvements

A majority of collisions for all modes in this segment occurred at or near the existing signalized intersections. Providing the following features would help to improve safety at those locations:

- High-visibility crosswalks
- Accessible pedestrian signals (APS) with countdown timers
- Increased pedestrian crossing time
- Adaptive pedestrian signal systems
- Bicycle detection
- Leading Pedestrian Intervals (LPI)
- Curb extensions to reduce turning radii
- Green marking in conflict zones and through intersections
- Potential protected intersection designs at Mary Avenue/Remington Drive and Mary Avenue/Fremont Avenue
- Median pedestrian refuge island
- Modify buffered bicycle lane striping on eastbound Fremont Avenue

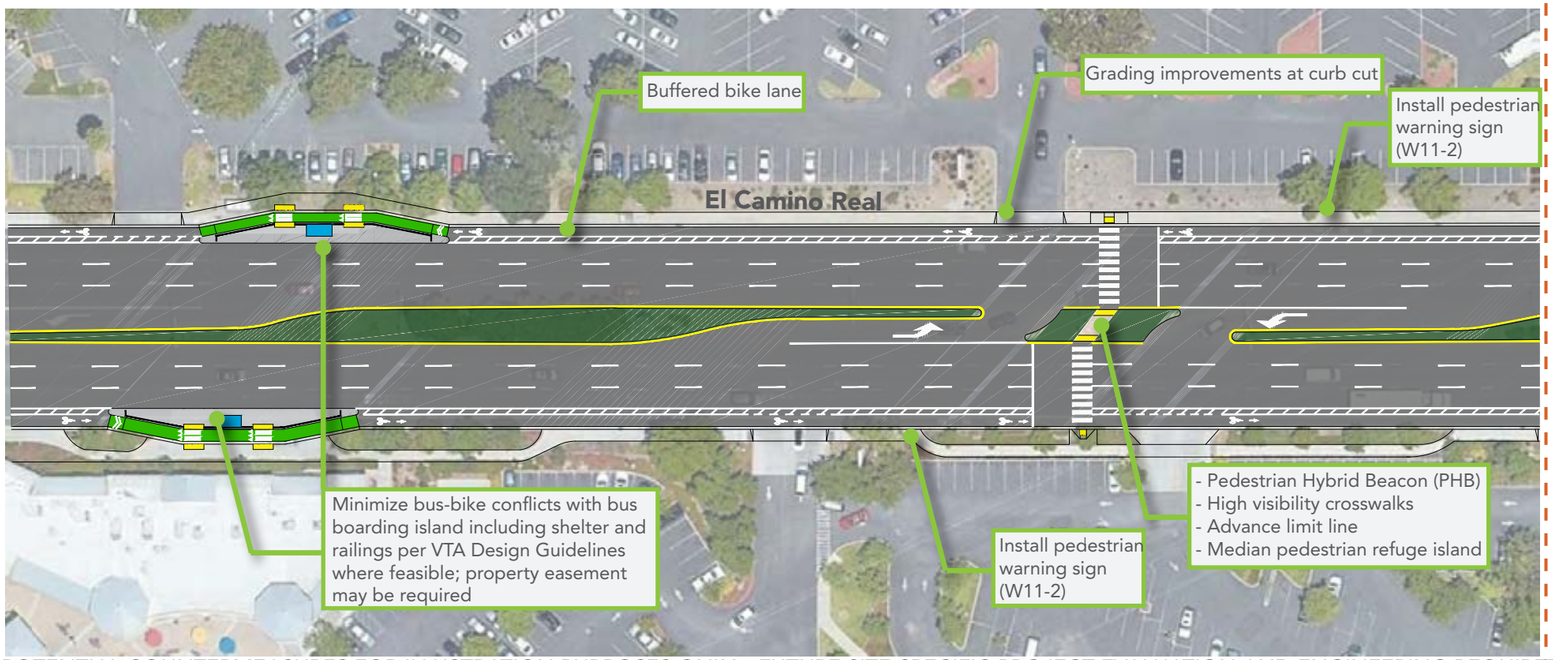
Note: See Appendix E for corresponding conceptual layout.

E. PRIORITY PROJECT CONCEPTUAL LAYOUTS (3)

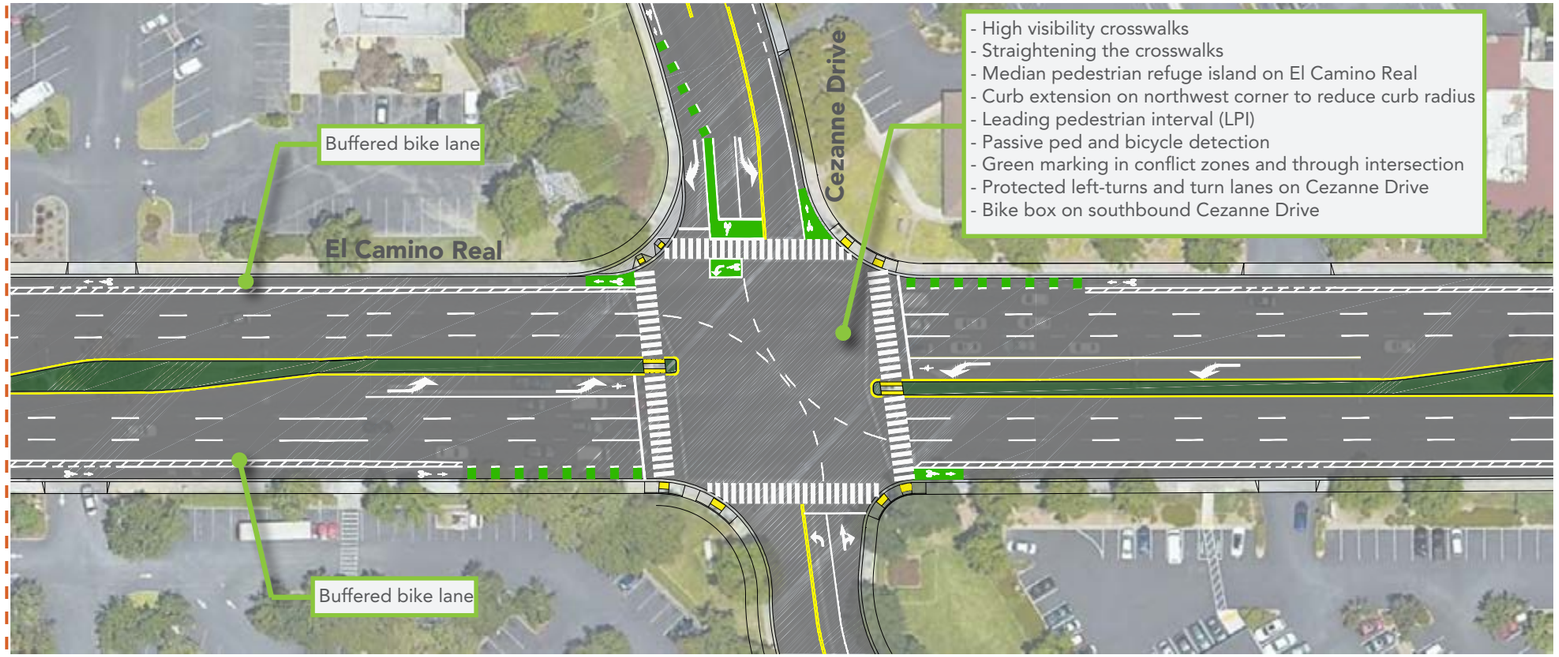
El Camino Real between S. Taaffe Street and S. Fair Oaks Avenue

SunnyvaleVisionZero

Conceptual Layout* - Priority Project Location 2



POTENTIAL COUNTERMEASURES FOR ILLUSTRATION PURPOSES ONLY – FUTURE SITE-SPECIFIC PROJECT EVALUATION AND ENGINEERING REQUIRED.



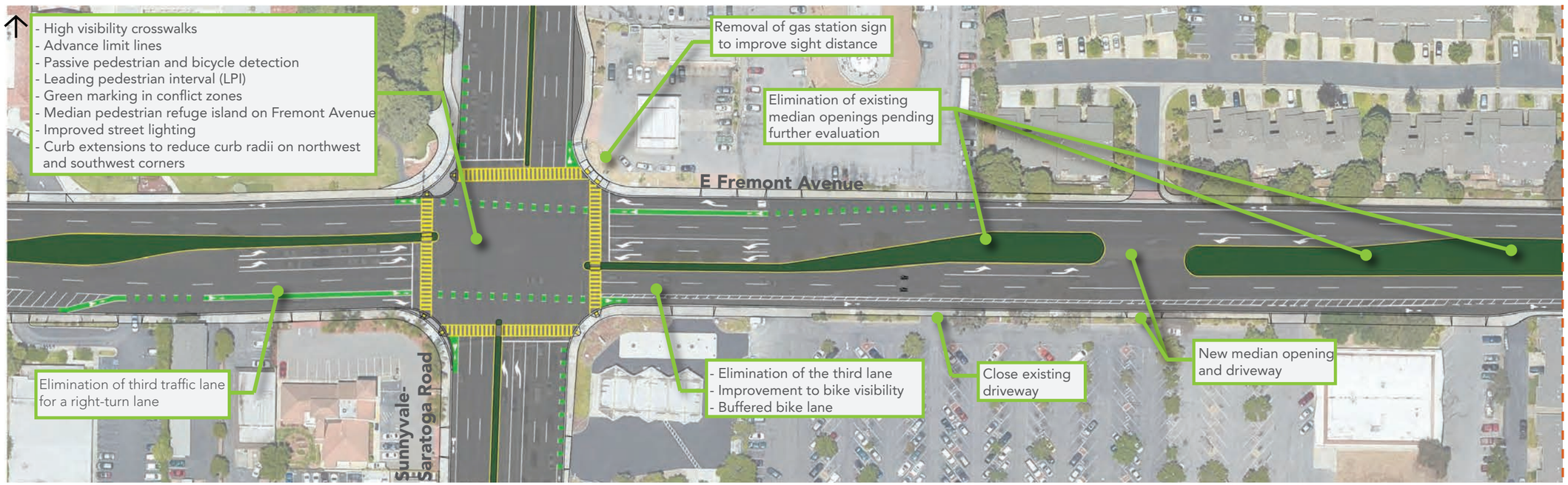
POTENTIAL COUNTERMEASURES FOR ILLUSTRATION PURPOSES ONLY – FUTURE SITE-SPECIFIC PROJECT EVALUATION AND ENGINEERING REQUIRED.

** Three priority projects were chosen as representative examples for further development as conceptual layouts. They represent an array of discrete contexts, typologies, and challenges. The conceptual layouts do not represent proposed improvements at specific locations, but rather allow stakeholders and residents to visualize potential real-life applications of various countermeasures and treatments in familiar contexts.*

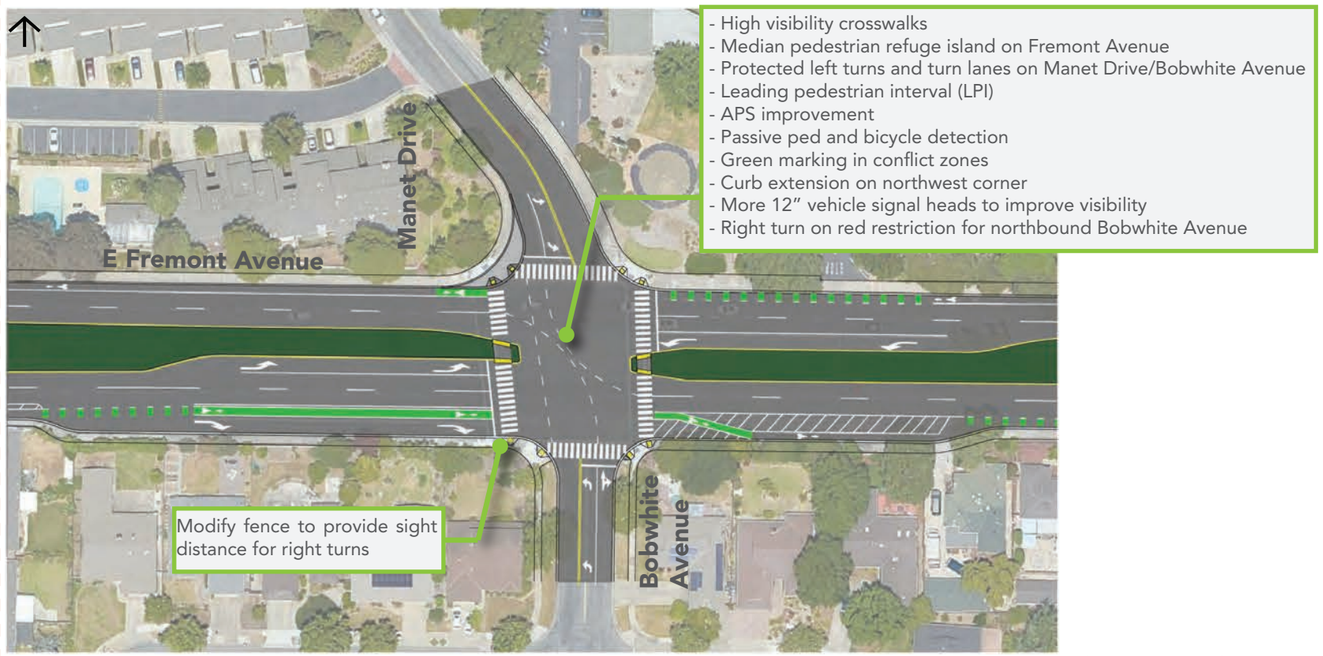
These were utilized to conduct walking tours along the three selected priority project corridors to collect feedback from participants about the potential improvements. Based on the comments received, the drawings were refined to produce the final conceptual layouts. The resulting conceptual layouts depict treatments that could be applied at a variety of locations throughout the City based on the outcome of further evaluation, engineering analysis, and design development.

Fremont Avenue between Sunnyvale-Saratoga Road and Floyd Avenue

SunnyvaleVisionZero
Conceptual Layout*
Priority Project Location 8



POTENTIAL COUNTERMEASURES FOR ILLUSTRATION PURPOSES ONLY – FUTURE SITE-SPECIFIC PROJECT EVALUATION AND ENGINEERING REQUIRED.



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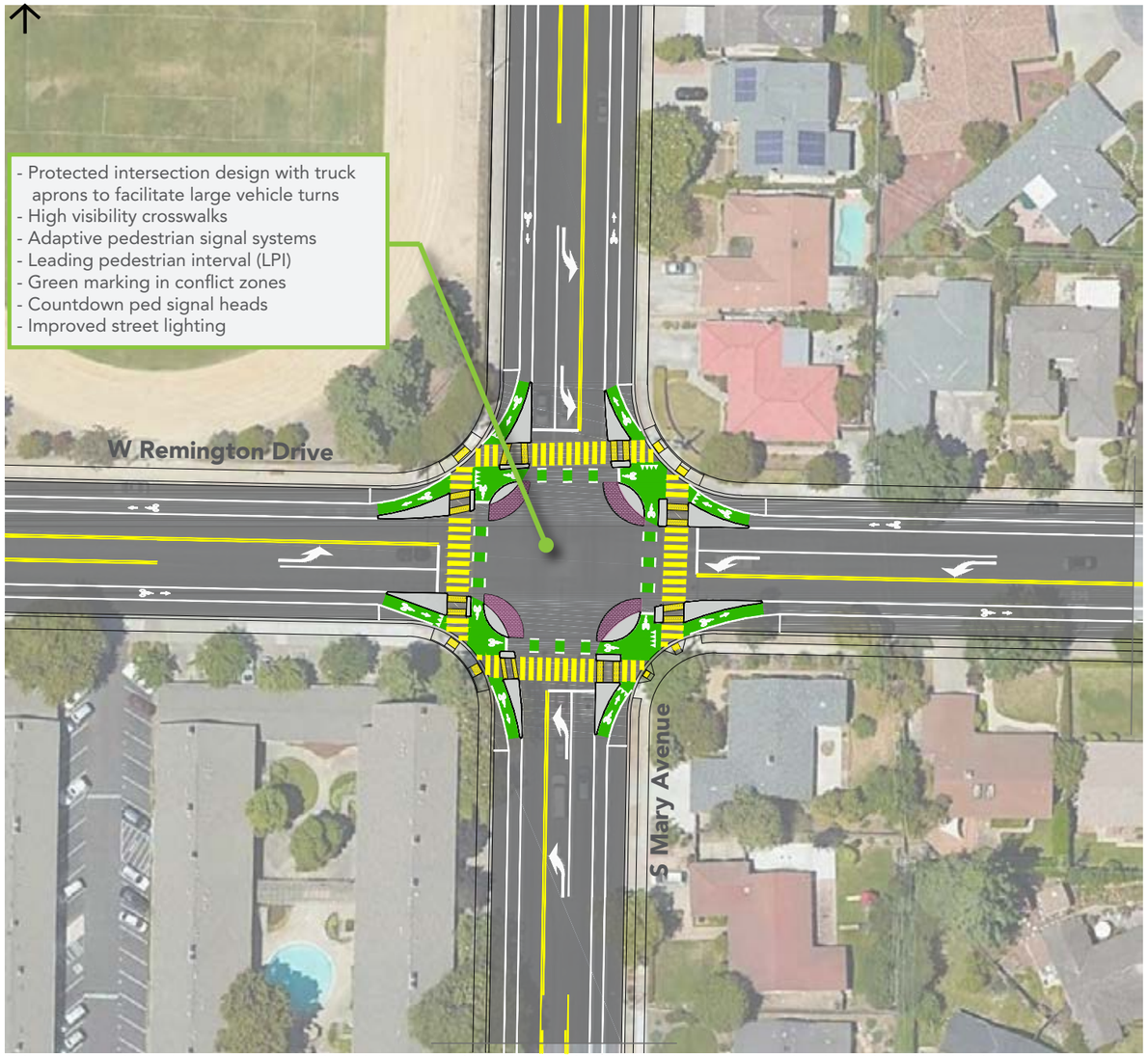
Mary Avenue between Remington Drive and Fremont Avenue

SunnyvaleVisionZero
Conceptual Layout* - Priority Project Location 10



POTENTIAL COUNTERMEASURES FOR ILLUSTRATION PURPOSES ONLY – FUTURE SITE-SPECIFIC PROJECT EVALUATION AND ENGINEERING REQUIRED.

S Mary Avenue/W Remington Drive

POTENTIAL COUNTERMEASURES FOR ILLUSTRATION PURPOSES ONLY – FUTURE SITE-SPECIFIC PROJECT EVALUATION AND ENGINEERING REQUIRED.

S Mary Avenue/Ticonderoga Drive

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These were utilized to conduct walking tours along the three selected priority project corridors to collect feedback from participants about the potential improvements. Based on the comments received, the drawings were refined to produce the final conceptual layouts. The resulting conceptual layouts depict treatments that could be applied at a variety of locations throughout the City based on the outcome of further evaluation, engineering analysis, and design development.